CHRYSLER

Complete Solutions for Powertrain

Chrysler Powertrain Technologies

Rockwell Automation Project Book

Control Technologies, Safety Components, Industrial Components and Applications

Version 1.4

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Project Statement

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This components project book is based upon the specific architecture specifications requested by the Chrysler Powertrain Technologies Group.

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Any printed copy is an uncontrolled copy. The user shall verify with the web site that he/she is in fact using the appropriate version of the specification for the specific project he/she is working on.

Any questions or comments with respect to this specification should be directed to the project engineer for the specific project in question.

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Introduction and Objective

This document contains product information to be used for the selection of components for CPT programs. This document provides a basic guide to selecting the correct type of electrical components for the correct application. It also provides the necessary contact information to assist in application engineering, program management review, and stocking locations for ease of purchasing.

All information contained in this document is superseded by the requirements of the CPT Global Specification.

A current, and accurate, copy of the specification can be downloaded from the following web address:

https://gsp.extra.chrysler.com/mfg/amedd/powertrain.htm

This project book describes all the Chrysler Powertrain Technologies approved component elements that have been adapted to the requirements of automated production.

1.1 Contacts

The project specific coordination for commercial and technical tasks between Rockwell Automation, the machine builder and the user is done by a named member of the Rockwell Automation team. All necessary decisions concerning dates, functionality, product releases etc. will be coordinated by Rockwell Automation and the machine builder.

	Commercial/ Technical
Title	**Larry Smentowski / Bill Sarver**
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Tech support	**www.rockwellautomation.com/support**
Tech support phone	**1.440.646.3434**

1.2 General Product Application and Safety Note

As part of a plant, system, or individual machine tool's design, specific considerations must be observed and taken by end users and machine builders alike to insure that their systems and/or machines operate within the operating guidelines and specifications of each product manufacturer so as not to damage the internal / external product components installed and used in these systems and machine tools and to insure the safety of all personnel working with these tools. As such, it is suggested that each machine tool builder obtain and understand the latest revision of the Chrysler Corporation's Powertrain Operations Manufacturing Engineering and General Safety Specifications prior to designing their machine tools. Design considerations for voltage, response time, torque, temperature, operation environment, etc. are available in the relevant product documentation from each product manufacturer and it is recommended that each machine tool builder take the time to acquaint themselves with the relevant product documentation and follow the guidelines outlined by each manufacturer.

1.3 Safety Laws and Regulations

The Machine Tool Builder is responsible for the implementation of the safety laws in the country of installation.

1.4 Safety Portfolio

http://www.ab.com/safety/prod_directory/

The use of these types of components is optional and it is left to the Original Equipment Manufacturer to decide if programmable safety devices or safety networks are technically or economically required.

If a programmable safety device is utilized, the entire safety system (logic and hardware) of the machine must be reviewed by the manufacturer(s) of the programmable safety devices for proper application of their product(s).

2 Short Circuit Current Ratings

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

UL 508A & NEC 409 Resources

Information on Revised Standard

NEC 409 and UL 508A Summary

The National Electric Code requires compliance with NEC article 409 in April 2006. Some states are currently following this code, and additional states are coming on board every month. To ensure that your industrial control panels are in compliance, Rockwell Automation provides you education and tools through our "UL 508A & NEC 409 Resources" website.

The New Article 409 covers "Industrial Control Panels". Industrial Control Panels are intended for general use, in ordinary locations, at 600V or less. One critical part of the new article is that Industrial Control Panels must be evaluated & marked for their Short Circuit Current Rating (SCCR). This is established by evaluating each feeder and branch circuits' SCCR and determining the smallest kA value. This weakest link will be the panel's kA value. In order to install a panel, the kA value must be greater than that of the incoming source.

How to Comply

The SCCR must be established using an approved method, one which is UL 508A, supplement SB. SCCRs must be evaluated for feeder circuits and branch circuits within the power circuit. There are three basic steps to this:

1) Establish the short circuit current ratings of individual power circuit components as specified in SB4.2, including all feeder and branch circuits.
2) Modify (limit) the available short circuit current within a portion of a circuit in the panel due to the presence of current limiting components as specified in SB4.3 Current limiting components provide an option for obtaining a higher overall panel kA rating with smaller rated devices.
3) Determine the overall panel short circuit current rating as specified in SB4.4

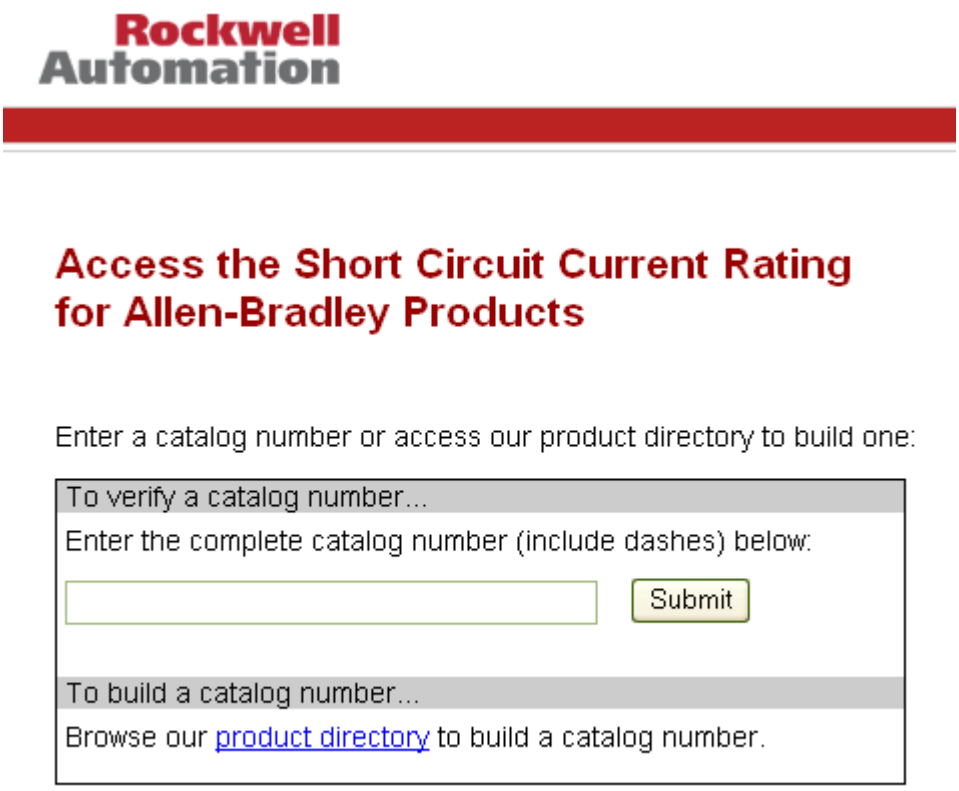
More information available in publication *SCCR-TD001A-EN-P*. Page 7 from this publication is shown on the next page:

http://literature.rockwellautomation.com/idc/groups/literature/documents/td/sccr-td001_-en-p.pdf

2.1 ProposalWorks Tool

ProposalWorks provides access to information on a broad range of Allen-Bradley products and services. It provides an easy to use interface to make it a snap to determine the exact catalog number for the item you need and to access current list pricing. Once you have selected the product the software automatically selects the appropriate informational documents, photos, etc. for that product and provides you the ability to include them easily in a word document.

2.1.1 Short Circuit Current Rating Tool


Rockwell Automation
Access the Short Circuit Current Rating for Allen-Bradley Products
Enter a catalog number or access our product directory to build one:
To verify a catalog number...
Enter the complete catalog number (include dashes) below:
Submit
To build a catalog number...
Browse our product directory to build a catalog number.

http://raise.rockwellautomation.com/RAConfig/SCRHome.asp

High Fault Component Short Circuit Current Rating Information Is Available Online

High fault short circuit current rating information can be easily accessed online at:

http://www.rockwellautomation.com/products/certification/ul508a/

Rockwell Automation
PRODUCT CERTIFICATION
UL 508A & NEC 409 Resources
Allen-Bradley Short Circuit Current Ratings (SCCR)
Information on Revised Standard

FIGURE 8: Rockwell Automation.com Website

Enter the catalog number and select "Submit" to attain short circuit current rating data for the identified component or browse the product directory if your catalog number is not known.

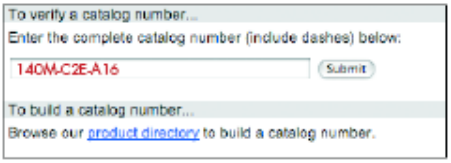

To verify a catalog number...
Enter the complete catalog number (include dashes) below:
140M-C2E-A16
Submit
To build a catalog number...
Browse our product directory to build a catalog number.

FIGURE 9: Catalog Number or Product Directory Selector Tool

View and download short circuit current rating information

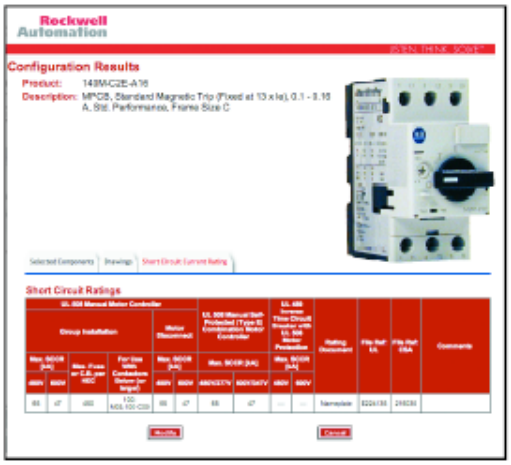
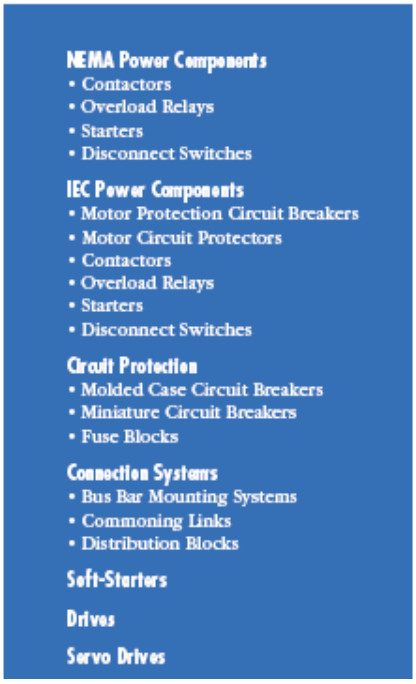


FIGURE 10: High fault short circuit current ratings for an Allen-Bradley Bulletin 140M Motor Protection Circuit Breaker



http://www.rockwellautomation.com/products/certification/ul508a/

3 Safety Relays & Components

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function

Safety Relay must meet all the Powertrain Specifications: Because relay can be ordered in different configurations – Refer to Powertrain Safety Specification, Section. Some items from the Chrysler Powertrain Safety Specification section include:

- "Safety relays shall contain dual channel inputs and redundant electromechanical output relays with force-guided normally open contacts."
- "The use of adjustable time delay safety output contacts for safety related functions (e.g. gate access) is prohibited."
- "Automatic reset of safety relays is prohibited."

Minotaur™ Safety Relays are dual channel units. Models are available with automatic, manual or monitored manual resets to operate at 24V DC. Number of outputs ranges from 3 to 9. Outputs with timed delays, two-hand versions and expansion units for up to 8 additional outputs are also available.

3.1 Safety Relays

3.1.1 MSR6R/T

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function/MSR6R-MSR6T

The MSR6R/T has an internal switch that allows the user to select either 1 N.C. single channel input for use with gate interlock and emergency stop buttons in lower risk applications or 2 N.C. dual channel inputs for higher risk applications. The MSR6R/T has an internal selector switch that can accommodate automatic/manual or a monitored manual reset function. Automatic/ manual reset can use a jumper or can be used to check operation of the contacts. Monitored manual requires the use of a manually operated normally open momentary switch to activate the outputs. The safety outputs have independent and redundant internal contacts to help ensure the safety function.

- Stop category 0
- Switch selectable input, Switch selectable reset
- 3 N.O. safety outputs, 1 N.C. auxiliary output
- 45mm wide housing
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.2 MSR30RT/RTP

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function/MSR30RT-RTP

The Minotaur MSR30RT/RTP is a microprocessor based, monitoring safety relay, with safety rated, solid state outputs. The versatility of the MSR30RT/RTP inputs allows it to be connected to gate interlocks, e-stop devices and four-wire safety mats. The gate interlocks and e-stops can be either single channel or dual channel normally-closed circuits. The reset capability of the MSR30RT/RTP allows it to set up for manual or automatic start and restart.

The outputs include two normally-open safety rated outputs that can be connected to loads up to 2A at 24V DC. These outputs can be used to send a safety stop signal to a machine or manufacturing system. The MSR30RT/RTP also has one solid state normally-closed auxiliary output, which must only be used to indicate the status of the MSR30RT/ RTP.

- Stop Category 0
- 2 Solid State Safety Outputs
- 1 Solid State Auxiliary Output

- 1 N.C., 2 N.C or Safety Mat Input
- Monitored Manual or Automatic/Manual Reset
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.3 MSR121RT

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function/MSR121RT

The Allen-Bradley Guardmaster Minotaur MSR121RT is a safety monitoring relay that provides three normally open safety contacts, a normally open auxiliary contact and a solid state auxiliary output for use with interfacing to PLCs. It has a versatile input arrangement. It can be connected to a single or dual channel safety gate or e-stop, a safety mat input or a light curtain that provides cross fault detection. Reset and output monitoring is determined by the wiring configuration. Automatic/manual reset can use a jumper or can be used to check operation of external contactors. Monitored manual requires the use of a manually operated normally open momentary switch.

The MSR121RT has 3 normally open safety rated outputs. The safety outputs have independent and redundant internal contacts to help ensure the safety function. It has one NC auxiliary output as well as a solid state PNP auxiliary output to indicate the status of the MSR121RT to a indicator lamp or a PLC.

- 3 Safety contacts NO, 1 Auxiliary contact NC
- 1 Solid state PNP auxiliary contact
- Single/dual channel operation
- Cross fault monitoring, Monitored or automatic reset
- E-stop, safety gate, safety mat or light curtain applications
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.4 MSR122 (Duplicates)

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/msr122e-expansion-relays

The MSR122E is designed to be an expansion relay for use with the Minotaur safety relays. The MSR122E is typically used in safety system applications where additional outputs switching connections are needed to help shut down a manufacturing process, properly and safely. The MSR122E can be connected as a single channel (1 N.C.) or dual channel (2 N.C.) input configuration. The outputs include 6 normally open safety rated outputs used to shut down the manufacturing system and 1 normally closed auxiliary output to indicate the status of the MSR122E. One additional normally closed output is available to allow the host relay to monitor the status of the MSR122E. The safety, auxiliary and monitoring outputs have independent and redundant internal contacts to help ensure the safety function.

- Safety category according to wiring
- 6 Safety contacts
- 1 Auxiliary contact
- 1 Monitoring contact

3.1.5 MSR125H/HP

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/msr35h-hp-two-hand-control-monitoring-relays

The Allen-Bradley Guardmaster Minotaur MSR125H/HP is a logic unit for monitoring and interfacing two-hand control devices with a safety-related circuit. The MSR125H/HP is for use with mechanical switches and the Rockwell Automation Bulletin 800Z Zero-Force Touch Buttons.

The MSR125H/HP has two normally open safety outputs. The safety outputs have independent and redundant internal contacts to support the safety function.

The MSR125H/HP requires the two switches to be operated within 0.5 seconds of each other and will only authorize the ON state while both switches are held down. If one of the switches is released, the output goes to the OFF state and the machine cannot be restarted until both buttons are released and then operated simultaneously.

The MSR125H/HP conforms to EN 574 Category IIIC, which gives specific requirements for two-hand control units and logic devices.

The MSR125H has fixed terminals and the MSR125HP has removable terminals.

Features:

- Category 4 per EN 954-1
- Safety category IIIC per EN 574
- Two-hand control unit
- Two N.O. safety outputs
- Fixed or removable terminals
- 22.5 mm wide housing

3.1.6 MSR127RP/TP/RTP

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function/MSR127RP-TP-RTP

The MSR127RP/TP/RTP can be connected in three different input wiring configurations: 1 N.C., 2 N.C., or with 2 PNP connections from a light curtain. When connected in the 2 N.C. fashion, the MSR127RTP checks for cross faults across the two inputs. When connected to light curtains, the light curtain must perform the cross fault detection.

The MSR127RP has a monitored manual reset (no auto reset allowed by Chrysler Powertrain). Models with automatic/manual reset can have the reset jumpered or can be converted to an unmonitored manual reset by adding a normally open switch in the monitoring loop. Models with monitored manual reset provide checking of the output monitoring circuit. The outputs include 3 normally open safety rated outputs as well as 1 normally closed auxiliary output. The safety outputs have independent and redundant internal contacts to help ensure the safety function. The auxiliary output is a nonsafety output intended to provide an external signal about the status of the safety outputs.

- Stop category 0
- 3 Safety contacts
- 1 Auxiliary contact
- Cross fault monitoring
- Monitored reset (Manual reset only – Chrysler Powertrain)
- Removable terminals
- Light curtain, E-Stop or safety gate applications
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1

- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.7 MSR131RTP

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Single-Function/MSR131RTP

The MSR131RTP can be connected in four different input wiring configurations: 1 N.C., 2 N.C., 2 PNP connections from a light curtain, or a four wire safety mat. When connected in the 2 N.C. fashion, the MSR131RTP checks for cross faults across the two inputs. When connected to light curtains, the light curtain must perform the cross fault detection. It has output monitoring for either automatic/manual reset (no auto reset allowed by Chrysler Powertrain) or a monitored manual reset. When configured with automatic/manual reset (jumpers on X1-X2 and X3-X4), it can have the reset terminals S33-S34 jumpered or can be converted to an unmonitored manual reset by adding a normally open switch in the monitoring loop (S33-S34). When configured to monitored manual reset, the output monitoring circuit is checked through the manual application of the reset switch. One solid state output indicates that the inputs are closed. The second solid state output indicates that the safety outputs are active. The safety outputs have independent and redundant internal contacts to help ensure the safety function.

- Light curtain, safety mat, E-Stop inputs
- 3 safety contacts, 2 aux contacts, 2 solid state outputs
- Cross fault monitoring
- Monitored reset (Manual reset only – Chrysler Powertrain)
- Removable terminals
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.8 MSR132E/EP

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/msr132e-ep-expansion-relays

The Minotaur MSR132E is a monitoring safety expansion relay unit with single or dual channel input and either immediate or timed offdelay outputs. It is designed to be operated as an “extension” of a “master” safety relay. When wired properly, the outputs of the MSR132E will mimic the outputs of the master relay. The outputs include 4 normally open safety rated outputs used to shut down the manufacturing system and 2 normally closed auxiliary outputs to indicate status of the MSR132E. One additional normally closed output is available to allow the host relay to monitor the status of the MSR132E. The safety, auxiliary and monitoring outputs have independent and redundant internal contacts to help ensure the safety function.

- Stop Category 0 or 1
- 4 Safety contacts N.O., 2 Auxiliary contacts N.C., 1 Monitoring contact N.C.
- Single channel input
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.9 MSR138DP

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/single-function-delayed/msr138dp

The MSR138DP can be connected in 4 different input wiring configurations: 1 N.C., 2 N.C., or 2 PNP connections from a light curtain. When connected in the 2 N.C. fashion, it checks for cross faults across the 2 inputs. When connected to light curtains, the light

curtain must perform the cross fault detection. The MSR138DP has output monitoring that can accommodate either automatic/manual reset (no auto reset allowed by Chrysler Powertrain) or a monitored manual rest. When configured with automatic/manual reset, it can have the reset terminals jumpered or can be converted to an unmonitored manual reset by adding a normally open switch in the monitoring loop. When configured to monitored manual reset, it checks the output monitoring circuit through the manual application of the reset switch.

- Stop category 0 and 1
- Light curtain, E-Stop, Safety Gate inputs
- 2 immediate safety outputs
- Delayed outputs may not be used according to Chrysler Powertrain specifications
- Cross fault monitoring, Monitored reset (Manual reset only – Chrysler Powertrain)
- Removable terminals
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.10 MSR142RTP Multi-Output Safety Relay

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/single-function/msr142rtp

The new MSR142 multi-output relay unit is the latest addition to the Guardmaster family of safety relays. It's ideal for use with everything from safety switches to light curtains and safety mats, featuring seven safety outputs, four auxiliary outputs and two solid-state auxiliary outputs. With this relay, users save money and cabinet space by adding more outputs without buying additional expansion modules. The MSR142 accepts both solid state and electromechanical inputs, is housed in a 67.5mm-wide DIN-rail mount housing with removable terminals, and is also equipped with automatic or monitored manual reset capabilities.

- EN954-1, ISO13849-1, IEC/EN60204-1, IEC 60947-5-1, AS4024.1, ISOTR12100, B11.19
- CE for all applicable directives, C-Tick, cULus, TÜV

3.1.11 MSR144RTP

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/single-function/msr144rtp

The MSR144RTP monitoring safety relay is a Category 4 device (per EN954-1) that provides an easily expandable solution where the requirement is to switch several safety circuits or different voltages from one E-stop. It is complemented by two types of plug-in expansion modules.

It can be connected in four different input wiring configurations (1 NC, 2NC, 2 PNP connections from a light curtain or a four wire safety mat) and is expanded by plugging in the connectorized ribbon cable from the dedicated expansion modules. The modules themselves are available in two types: the MSR230P module offers four additional (NO) safety contacts, while the MSR238DP time-delayed output expansion module features 2 NC safety and one NC auxiliary off-delayed contacts for time delays up to 5 minutes. Both can be used with the MSR144RTP in any combination up to a maximum of five expansion modules.

- Stop category 0 or 1 (with MSR238)
- Light curtain, safety mat, E-Stop inputs
- Cross fault monitoring, Monitored or automatic reset
- Removable terminals, Expansion for up to 5 modules
- 2 NO safety outputs, 2 NC auxiliary outputs, 2 solid state auxiliary outputs
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)

- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.1.12 BUL. 440R - Guardmaster® Safety Relays (DI,DIS,SI,CI,EM, and EMD)

The new generation of Guardmaster® Safety Relays addresses the broad scope of applications in the intricate safety world with a range of devices. Designed to meet new functional safety standards, such as EN ISO 13849-1 and EN 62061, the new family
offers key functions to simplify installation and system complexity. A broad range of safety devices such as safety interlock switches, emergency stop devices, pressure sensitive safety mats, and OSSD devices such as safety light curtains are all compatible with the same relay without any additional configuration. The functionality of two standard safety relays can be achieved in one Dual Input (DI) device, allowing connection of two dual-channel input devices into one safety relay. A TÜV-approved single rotary switch sets the required function of the safety relay and eliminates the typical redundant switch setting process. Selectable functions include simple logic, reset, timing, and diagnostics. The single-wire safety connection simplifies cascading and expanding safety functions by linking relays with a single-wire connection. A dynamic signal from device to device provides a linkage in accordance with SIL 3, PLe, and allowing easy addition of extra I/O, which can be configured with simple logic combinations. Flexible AND/OR logic can be configured simply in a single relay or through a combination of relays via single-wire connection. Expansion modules are available with four immediate or time delayed outputs. The time delay module can be configured for on delay, off delay, or jog.

Features

- Suitable for applications up to PLe, SIL 3 Per ISO13849-1
- Stop Category 0
- One or two dual-channel inputs
- Two or three safety contacts
- One auxiliary contact
- Cross-fault monitoring
- Rotary switch configures auto/manual or monitored manual reset
- Same rotary switch configures AND/OR logic of input to device
- Removable terminals
- Can be used with interlocks, light curtains, safety mats, E-stops, and SensaGuard™ switches
- Single-wire safety output connects to single-wire safety input relays while maintaining SIL 3, PLe
- Timed ON delay, OFF delay and Jog outputs on EMD

3.1.13 440C-CR30 SW Configurable Safety Relay

The Guardmaster® 440C-CR30 Software Configurable Safety Relay is flexible, cost-effective, and easy to use. This relay is ideal for applications requiring as many as nine dual-channel safety circuits and controlling as many as five output zones. You can configure this relay using the Connected Components Workbench™ software.

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Guardmaster-440C-CR30

Features

- Suitable for applications up to PLe, Cat. 4 per ISO 13849-1 and SIL CL3 per IEC 62061
- Offers 22-point embedded safety I/O
- Supports as many as two Micro800® Plug-in Modules
- Provides embedded communication via USB programming port and non-isolated serial port for RS-232 communications
- Includes two single-wire safety input/output points for interlocking between Guardmaster® safety relays

Software

Use Connected Components Workbench software with Microsoft Visual Studio® to program your Guardmaster® 440C-CR30 Configurable Safety Relays

Products

- Guardmaster 440C-CR30 Software Configurable Safety Relay

Certifications

- CE marked for all applicable directives, c-UL-us, TÜV pending

http://www.ab.com/en/epub/catalogs/3377539/5866177/5985760/4444281/12620950/12620952/Introduction.html

3.2 MSR200 - Modular Configurable Safety System

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Modular/200-Series

Bulletin 440R expandable modular safety monitoring relay use plug-and-play digital I/O expansion modules. The MSR200 can provide up to 22 input circuits with a single relay system. The use of multiple input modules also allows inputs from various types of safety devices (mats, light curtains, switches, etc) to the same relay assembly.

The MSR200 family's microprocessor-based design offers enhanced diagnostic and communication functionality. It also allows the relay to deliver output and error status over a fieldbus network to an operator panel or other device. The output and error status text can be customized using this free download. Removable terminals allow easier maintenance, lowering your long-term costs.

- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV

3.3 MSR300 - Modular Configurable Safety System

http://ab.rockwellautomation.com/Relays-and-Timers/Safety-Relays/Configurable/300-Series

The MSR300 expandable modular safety monitoring relay systems use plug-and-play digital I/O expansion modules. It offers a logic configuration with multiple inputs and controlling multiple independent outputs. The system can control up to 3 group outputs and perform simple function block logic configurations through rotary switch settings. The MSR300 provides up to 20 input circuits per base module.

- Category 4 per EN 954-1, EN 574 Type III C
- SIL3 per IEC 61508.Stop category 0
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1
- Category Cat. 3 per EN 954-1 (ISO 13849-1)
- Approvals C-Tick, CE marked for all applicable directives, cULus & TUV
- Pulsed input monitoring, Solid-State input annunciation
- Input and output status LEDs
- EDM (one per zone)
- Manual, monitored or automatic reset (one per zone)
- Zone control .up to 3 independent zones
- RS232 diagnostic communications
- Removable terminals

Inputs Supported

- E-Stops, Safety Gates, Safety Mats, Light Curtains, Two-Hand Control
- 3 second or infinite simultaneity
- Cam switch for zone muting

3.4 Safety Components

http://www.ab.com/safety/prod_directory/index.html

Additional safety items can be selected from the Chrysler Powertrain Safety approved source list. These types of components have been specifically tested and approved for use in Chrysler Powertrain or their safety function.

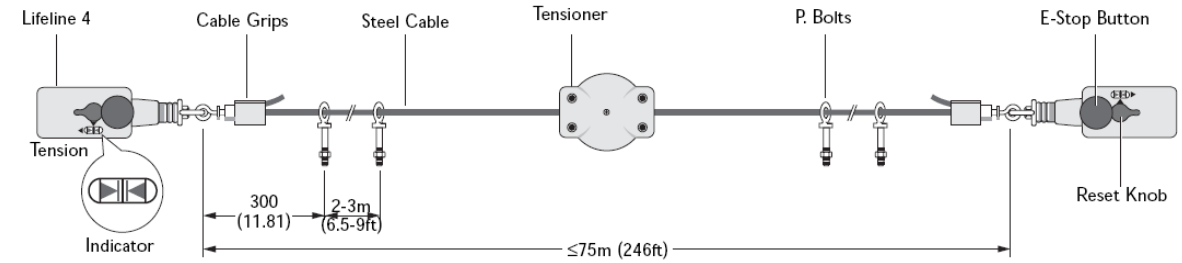
3.4.1 Safety Cable Pull switches – 440E

http://ab.rockwellautomation.com/Safety/Push-Buttons

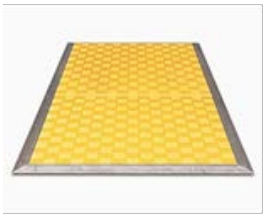
Lifeline 3 is a shorter range cable-operated emergency stop device (30m). The **Lifeline 4** cable-operated emergency stop device is an addition to the Lifeline family of products and has been designed to cater for longer rope lengths. It incorporates all the features of the existing Lifeline 4 but can be used on cable spans from 75m to 125m in length. It is designed to meet the stringent requirements of EN 418 (Safety of Machinery – Emergency Stop Equipment) and is available with 4 sets of contacts. The Lifeline 4 rope system can be installed along or around awkward machinery and can be actuated from any position along the cable/rope, providing a constant access emergency stop facility.

- Rope status indicator on switch lid, reducing installation and re-tensioning time
- 4 sets of contacts providing maximum flexibility
- Heavy-duty weatherproof case sealed to IP66
- Designed to conform to EN 418, EN 292, EN 60947-5-1, ISO 13850, BS 5304 and EN 60947-5-5
- Switches from 75 to 125 meter span
- Also available in stainless steel

Mounting Specifications



3.4.2 MatGuard™ Safety Mats – 440F



http://ab.rockwellautomation.com/sensors-switches/operator-safety/matguard-safety-mats

- EN 1760-1, EN954-1 (ISO 13849-1) category 3 and IEC/EN 60204-1, AS 4024.5, ANSI B11.19, ANSI RIA R15.06
- Multiple mat configuration shall contain no dead zones
- 1 million actuations by a mass of 75Kg
- With force applied, output will remain in the off state
- Dual channel monitoring, detection of single fault in control mat, controller or wiring will result in a

failsafe shut down of system (cut wire, short, relay failure etc.)
- Heavy Duty
    - o 4 wire design, No dead spots, 4500 psi

3.4.3 MatGuard™ Safety Mat Controllers

http://ab.rockwellautomation.com/relays-and-timers/safety-relays/matguard-controllers

Description:

- The MatGuard Control Unit monitors all of the mats which are connected together to form a safeguarded zone. The safeguarded zone can be up to a total of 100m2 and made from any number of mats. The controller is designed to interface with the control circuit of the machine and includes two safety relays to ensure control redundancy.

- The controller detects a presence on the mat, a short circuit, or an open circuit. Under each of these conditions, the safety output relays turn off. When interfaced properly, the machine or hazardous motion will receive a stop signal, and an auxiliary output relay turns ON.

- The controller comes in three different package styles, a plastic case for surface or wall mounting, a steel case for surface or wall mounting and a 35mm DIN rail mounting style. Each style offers many of the same basic features. Each controller accepts power supplies of 24V AC/DC. The plastic and steel-cased styles include reset buttons whereas reset button for the DIN rail mounted style must be supplied separately. The steel-cased controller offers extra protection against inadvertent impacts.

Features:

- Selectable voltage supply
- Auto/manual reset
- Four-wire system to detect opens and shorts
- Third Party Approval — AMTRI

3.4.4 Safety Gate Switches - 440G/440K

http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-Switches

All Gate switches are to be ordered by “bundle”. The Cable will be ordered at the same time. Please contact Rockwell Automation for assistance.

3.4.5 Guard Locking with solenoid - 440G-MT

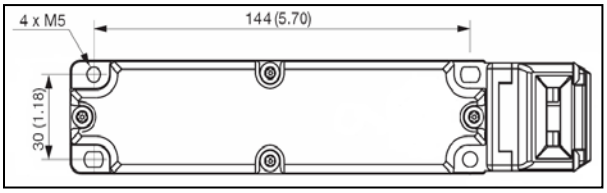
http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-Switches/440G-MT-Guard-Locking-Solenoid-Switches

The 440G-MT solenoid switch is a positive mode, tongue operated guard locking interlock switch that locks a machine guard closed until power is isolated and ensures that it remains isolated while the guard is open. The guard may only be opened when a signal is applied to the internal solenoid which releases the lock mechanism. The 440G-MT locking mechanism withstands forces up to 1600N (360lbs) and the die-cast alloy housing is ideal for use in harsh environments.

- EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/ EN60947-5-1, ANSI B11.19, AS4024.1
- Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems
- cULus, TUV

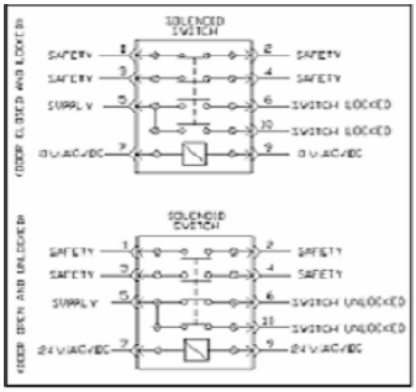
- 30mm x 144mm mounting holes
- Rotating head
- No LED's, No ronus (override) key
- Power to unlock
- 10 pin mini connector with pin-out as shown

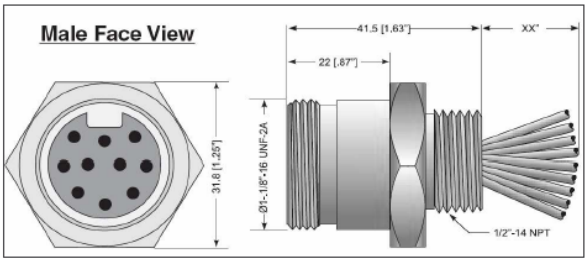
- 2 sets of NC contacts (safety)
- 1 set of NO contacts (door open)
- IP 65 (with connector)
- 24 DC Versions
- This switch comes with mini QD connector

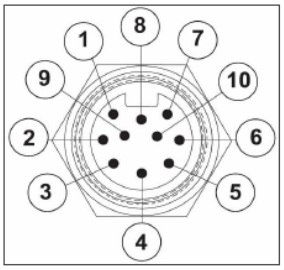


Solenoid Switch - Connector diagram

Pin	Wire Color	Function
1	Orange	Safety Contact #1 (N.C.)
2	Blue	Safety Contact #1 (N.C.)
3	White/Blk Tr.	Safety Contact #2 (N.C.)
4	Red/Blk Tr.	Safety Contact #2 (N.C.)
5	Green/Blk Tr.	Door/Switch Status Feed
6	Orange/Blk Tr.	Switch locked/unlocked status
7	Red	Solenoid Power (24V AC/DC)
8	Green	Spare
9	Black	Solenoid Power (24V AC/DC)
10	White	Switch locked/unlocked status



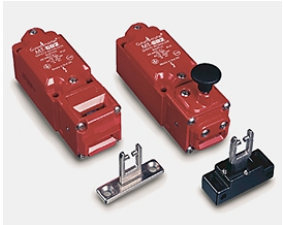




10 Pin Mini Connector (male) conforming to SAE H1738-2 (Specification for Mini, Micro, and Nano Plugs and Receptacles)

EJA Installation Sheet
Addendum Pt.No.47737

3.4.6 Tongue Switch without solenoid – 440K-MT-GD2

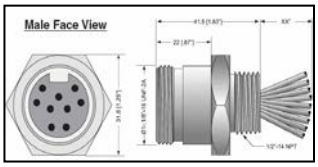


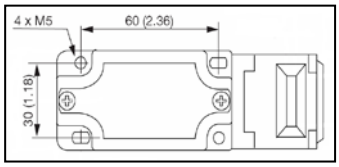
http://ab.rockwellautomation.com/sensors-switches/safety-interlock-switches/mt-gd2-tongue-interlock-switches

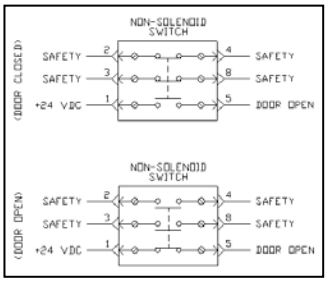
The MT-GD2 is a robust tongue actuated safety interlock switch designed to fit at the opening edge of sliding, hinged or lift-off guards. With its dual entry slots and rotatable head, the MT-GD2 can offer eight different options for actuator entry. The MT-GD2 features a compact housing of only 117mm x 40mm x 43mm (4.61in x 1.57in x 1.69in) with DIN standard fixing centers and includes forced guided contacts and a tamper-resistant mechanism.

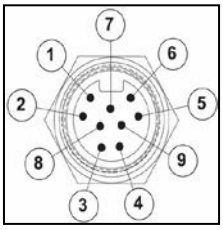
The MT-GD2 is available with 2 N.C. + 1 N.O., contact sets enabling it to be used as part of a system for higher-risk applications. The unit is sealed to IP67 and has 1 conduit entry 1/2in . Operation of the switch is achieved by the insertion of the specially profiled stainless steel actuator which should be permanently fixed to the leading edge of the guard door. An optional flexible actuator allows the MT-GD2 to operate on smaller radii doors (>60mm (2.36in)) and a flat actuator gives additional mounting options.

- 60mm x 30mm mounting holes
- Non mechanical release
- Rotating head
- No LED's
- No ronus (override) key
- Power to unlock
- 9 pin mini connector with pin-out as shown
- 2 sets of normally closed contacts (safety)
- 1 set of normally open contacts (door open)
- IP 65 (with connector)
- 24 DC Versions
- This switch comes with mini QD connector









3.4.7 Guard Locking Switches: 440G-LZ

The 440G-LZ Guard Locking Switch is designed for partial body access guard doors. This switch combines microprocessor technology with an RFID coded actuator, and it features a locking bolt drive mechanism that locks only when the correct actuator is detected. With this functionality, the switch is TÜV certified to Ple, Cat. 4 (EN/ISO 13849-1) which is the highest level of safety for guard door position and lock monitoring.

http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-Switches/440G-LZ-Guard-Locking-Switches

Features

- Consumes up to 60% less power than competitive products
- Offers RFID standard coded (low) or uniquely coded (high) actuators
- Available in two models: power-to-release (safety of people) and power-to-lock (machine protection)

Products

- 440G-LZ Guard Locking Switch

Certifications

- CE marked for all applicable EU directives, cULus (UL508), TÜV, C-tick

http://literature.rockwellautomation.com/idc/groups/literature/documents/ca/s118-ca502_-en-p.pdf

3.4.8 Guard Locking Switches: 440G-TLS-Z GD2

The TLS-Z GD2 Guard Locking Switch is an interlock switch that has a uniquely coded RFID door sensor with inductive door position sensing technology. This switch can detect if an actuator key breaks or becomes separated from its door mounted position. Built with the same solid-state technology as the TLS GD2, this switch supports the highest level of safety – Performance Level “e” (Ple) to EN ISO 13849-1.

http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-

Switches/TLS-Z-GD2-Guard-Locking-Switches

Features

- Uniquely coded RFID door sensor
- Solid-state OSSD outputs connectable to ISO 14119
- Available in power-to-release or power-to-lock models
- Easy QD connection
- High locking force ≤2000 N (450 lb)

Products

- 440G TLS-Z GD2 Guard Locking Switch

Certifications

- CE Marked for all applicable EU directives, cULus (UL 508), and TÜV

Accessories

We offer a variety of accessories for your 440G TLS-Z-GD2 Guard Locking Switches, including:

- Actuators
- Bolts
- Covers
- Emergency override keys
- Flexible release cables

http://literature.rockwellautomation.com/idc/groups/literature/documents/ca/s118-ca500_-en-p.pdf

3.4.9 Prosafe™ Trapped Key Interlock: 440T

http://www.ab.com/en/epub/catalogs/3377539/5866177/3377559/6387374/6387378/

Key interlock systems can be configured to ensure a predetermined sequence of events takes place or that hazards have been reduced before operators can become exposed to them. It is a mechanical system and is therefore widely used in applications including those where the location of plant, environment or explosive atmospheres make the use of electrical interlock systems unsuitable or expensive to install. In addition, unique coding can be provided, lending to a greater degree of security and tamper resistant.

CE Marking—Tested and Approved

Only Prosafe products carry the prestigious BG mark: a sign of safety, independently tested by the German Berufsgenossenschaftliches Institut für Arbeitssicherneit, 'BIA'. Additional tests for valve interlocks include Lloyds Certificate for fire test and salt-mist resistance. Switches and sensors carry the necessary 'BASEEFA' approvals while isolator switches carry UL, CSA and TUV approvals.

- All stainless interlocking and coded parts—including the code barrel and internal components at no extra cost.
- Weather cap as standard—no extra charge for dust caps and seals.
- Standard red colour-coded key and ID tags—at no extra charge.
- Custom colour/text keys and ID tags—nominal extra charge.
- A complete range of isolators, key exchange, miniature valve interlocks and

gate interlocks—all using the same key principle.

3.4.10 Non Contact Interlocks Sipha – 440N-S

http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-Switches/Sipha-Sensors

Sipha's design incorporates magnetically sensitive elements which must be triggered in a particular sequence to operate correctly. The Sipha sensor helps prevent defeatability by a simple magnet. The Sipha Sensor must be connected to the Sipha control unit giving a monitored circuit. For high-risk applications the control unit is used with a single sensor to give a high-integrity system. For other applications, multiple sensors can be connected to one Sipha control unit. Sipha has facilities for connecting a manual reset button and for monitoring external devices such as contactors.

Four types of sensors and actuators are available incorporating different operating distances and physical sizes.

- Non contact actuation
- Magnetic coded sensing
- Four housing styles
- Must be operated with its own safety control unit
- EN 954-1, ISO13849-1, IEC/EN, 60204-1, IEC 60947-5-1, ANSI B11.19, AS4024.1, NFPA79, EN1088
- Category Cat. 3 and Cat. 4 per EN 954-1 (ISO 13849-1)
- CE marked for all applicable directives, cULus & TUV

3.4.11 SensaGuard – 440N-Z

http://ab.rockwellautomation.com/Sensors-Switches/Safety-Interlock-Switches/Non-Contact-Interlock-Switches

SensaGuard non-contact safety switches are Category 4 /SIL 3 rated switches per EN954-1, TÜV functional safety approved to IEC61508.

Featuring the latest generation of RFID technology for coding and inductive technology for sensing, SensaGuard large sensing range and tolerance to misalignment is a cost-effective solution that is ideally suited for a wide range of industrial safety applications.

Switches can be connected to a standard safety relay, for example, the MSR126, MSR127, MSR200/300 Family, SmartGuard™ and Safety I/O Blocks. There are multiple actuator sizes for large sensing distance.

- Multiple actuator sizes for large sensing distance typically (15 – 25mm)
- IP69K environmental rating
- Short circuit and over voltage protection
- LED located on the switch for door status and troubleshooting
- 2 Safety PNP outputs and 1 auxiliary PNP output

3.4.12 Safety Contactors – 100S / 104S

http://ab.rockwellautomation.com/motor-control/iec-contactors/iec-safety-contactors

Bulletin 100S-C/104S-C safety contactors provide mechanically linked, positively guided contacts, which are required in feedback circuits for modern safety applications. The positively guided N.C. auxiliary contacts will

not change state when a power contact welds. For additional information and selection of overload relays, mounting systems, and other MCS components, please see Publication 100-SG003C-EN-P.

WHEN USING 24VDC SAFETY CIRCUITS, USE OF GOLD PLATED, BIFURCATED CONTACTS IS HIGHLY RECOMMENDED.

- **Gold plated, bifurcated control circuit contacts**
- Low power reliability down to 5V, 3mA
- Red contact housing for easy identification
- Permanently fixed front mounted auxiliary contact block
- Protective cover prevents manual operation
- Meets IEC 60947-5-1 Annex L requirements for “Mechanically Linked” contact performance for both contactors and relays
- Meets IEC 60947-4-1 Annex F requirements for “Mirror Contact” performance for contactors
- Meets GM DHS-1 “Design for Health and Safety” requirements
- SUVA third party certified to IEC 60947-5-1 Annex L and IEC 60947-4-1 Annex F

3.4.13 IEC Safety Control Relays – 700S-CF

http://ab.rockwellautomation.com/Relays-and-Timers/700S-CF-IEC-Safety-Control-Relays

Bulletin 700S-CF Safety Control Relays provide mechanically linked, positively guided contacts, which are required in feedback circuits for modern safety applications. **WHEN USING 24VDC SAFETY CIRCUITS, USE OF GOLD PLATED, BIFURCATED CONTACTS IS HIGHLY RECOMMENDED.**

- **Gold Plated, Bifurcated Version for Low Level Switching Applications**
- Front-mounted auxiliary contact (Permanently fixed, Protective cover to prevent manual operation, Red contact housing for easy identification, Incorporates IEC 60947-5-1 “Mechanically Linked” symbol)
- AC and DC operating coils
- SUVA third-party certification

3.4.14 NEMA Safety Contactors: Heavy-Duty Safety Control Relay – 700S-P, 700S-PK

http://ab.rockwellautomation.com/Relays-and-Timers/NEMA-Heavy-Duty-Relays

- Mechanically Linked Contacts meet IEC 947-5-1-L
- 2…12 poles – all Mechanically Linked
- Red Cover for Easy Identification of Safety Circuits
- IEC Mechanically linked Contacts Symbol Displayed on Front
- Visual Indication of Contact State
- UL Listed (File No. E14840) (Guide No. NKCR) per UL 508
- CSA Certified (File No. LR1234) per CSA C22.2 No. 14
- CE Certified

3.4.15 NEMA enclosed Safety Disconnects - 1494G

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

http://ab.rockwellautomation.com/Motor-Control/Disconnect-Switches/NEMA-Disconnect-Switches

Disconnect Switch: The Switch blades are fully exposed when the disconnect switch is de-energized for instant visual status. Switch, mechanism and handle are always connected, even when the enclosure door is open. Line shield prevents accidental contact with the line side of the switch. Protective fuse cover (optional) prevents accidental contact with the load side of the switch, power fuses and load side power wire connections

- cULus Listed per UL 98 for switches 30…600A
- UL Listed per UL 508 "at motor" disconnect rating for switches 30…100 A

Optional Components: For factory modification or field installation:

- Door viewing window
- Auxiliary contacts and Electrical interlocks
- Pilot light, selector switch, push button, and Protective fuse covers
- Metal and stainless steel disconnect handles
- Fuse clip kits, Conduit connectors, Ground lugs

Disconnect Handle: Ruggedly-designed molded handle optionally available with painted metal or stainless steel. Color-coded handle for instant visual status to determine if the switch is "ON" (red) or "OFF" (green or black). They can be padlocked in the "OFF" position with up to three (3) shackle-type padlocks and in the "ON" position with one (1) shackle-type padlock. When the switch is energized, the defeater screw must be deliberately turned to open the door. When the enclosure door is open the defeater lever must be deliberately moved to energize the disconnect switch.

Enclosure: Industrial grade construction available in painted metal (Type 3R/4/12), stainless steel (Type 4/4X) and non-metallic (Type 4/4X) material for use in most industrial environments. Padlocking provision to restrict the enclosure door from being opened to gain access inside the enclosure is available. Mounting feet are provided.

600V 3-Pole, 3-Phase

- 30…600 A (500 Hp)
- Fusible and non-fusible versions
- Can accommodate Class H/K, R, and J fuse clips
- Up to 200,000 A short-circuit withstand rating with proper fusing
- Available in standard size (1494G) and extra-capacity enclosures (1494GX)
- Enclosures: Type 3R/4/12 painted metal, Type 4/4X stainless steel, Type 4/4X non-metallic

600V 6-Pole 3-Phase

- 30…200 A (150 Hp)
- Fusible and non-fusible versions
- Can accommodate Class H/K and J fuses
- Up to 200,000 A short-circuit withstand rating with proper fusing
- Enclosures: Type 3R/4/12 painted metal and Type 4/4X stainless steel

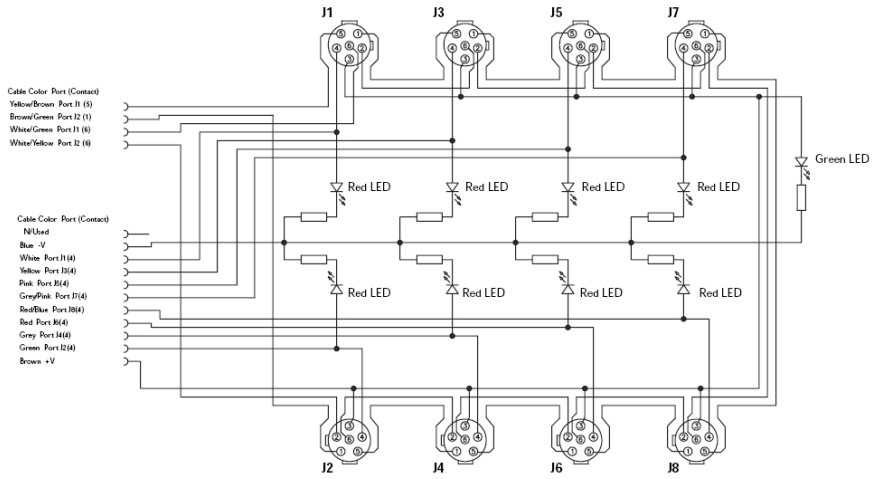
3.4.16 Safety Connection Systems – 898R, 898D

http://ab.rockwellautomation.com/Connection-Devices/Safety-Connection-Systems

3.4.16.1 Quick Distribution Systems with Enunciation

- Eight 6-pin micro connectors
- 14-conductor main cable
- Individual enunciation outputs or each port
- For use in category 2 or 3 systems per EN 954-1

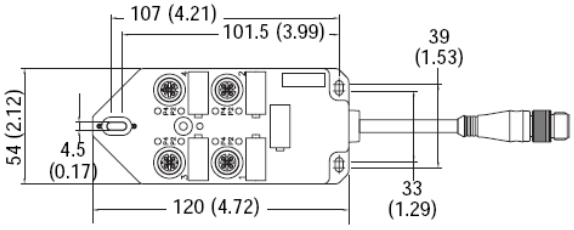
- Enclosure rating IP67, NEMA 69
- Prewired for dual-channel N.C. safety plus individual N.O. enunciation

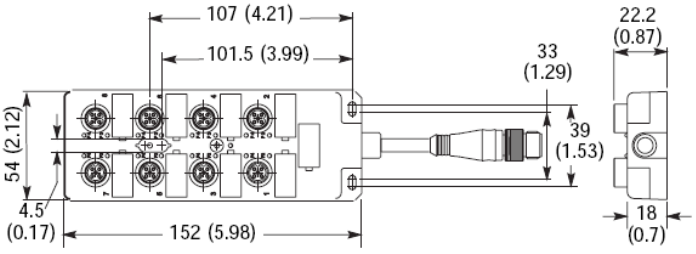


3.4.16.2 Quick Distribution Systems without Annunciation

- Prewired for dual-channel (one N.O./one N.C.) safety
- 4 or 8 safety-wired 4-pin DC micro connectors
- 4-pin male DC micro pigtail main connection
- For use in category 2 or 3 systems per EN 954-1
- Enclosure rating IP67, NEMA 69

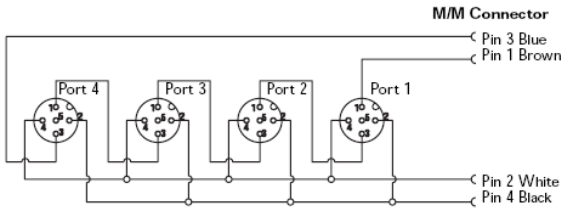
Approximate Dimensions—mm (inches)

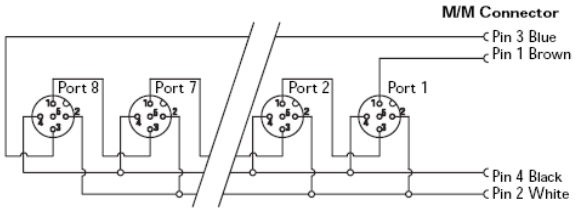




Dimensions are approximate. Illustrations are not drawn to scale.

Wiring Diagrams





4 Machine Alert machine protection

http://www.ab.com/es/epub/catalogs/12768/229240/229258/3170949/10357727/

Document Reference: *Sensors C115R-CA001A-EN-P*

Machine Alert products are economical, supplemental motor protection for protecting equipment investment and minimizing downtime. These full range of function-specific devices are available in compact 22.5mm and 45mm packages

- Microprocessor technology
- Password protection
- Compact size saves valuable panel space
- LCD / keypad programming takes the guesswork out of device set-up
- DIN rail mounting makes installation a snap
- Terminals provide IP 20 finger safety and are clearly marked
- LED's or LCD display provides relay status indication
- Global acceptance with CE, CSA and UL approvals

4.1 Phase monitors – 813S

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Supplementary-Protection/Phase-Monitors

Monitors that guard against the damaging effects of phase loss, under and over voltage, phase imbalance, and phase reversal for applications such as:

- Pumps, Compressors, Fans, Blowers

Type E2

- Programmable settings
  - under voltage, over voltage
  - phase imbalance
  - time delay, relay energize
  - time delay, relay de-energize
- RMS based voltage monitoring up-to 690 Vac
- Pre-start as well as running protection
- Automatic reset
- (1) N.O. and (1) changeover contact

4.2 Current monitors – 809S

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Supplementary-Protection/Current-Monitors

Monitors that provide the added benefits of under and over current detection for applications such as:

- Conveyors, Fans, Pumps, Mixers

Type E1

- Single-phase current or voltage monitoring
  - 0.5 … 5A ac/dc
  - 1.0 … 24.9V or 10 … 249V ac/dc
- Programmable settings
  - actuation value, release value, delay time
- Automatic reset
- (1) changeover contact

Type E2

- Single-phase current monitoring
  - 1.0 … 15A ac/dc
- Programmable settings
  - actuation value, release value,
  - time delay, relay energize
  - time delay, relay de-energize
- Automatic reset
- (1) N.O. and (1) changeover contact

Type E3

- Three-phase current monitoring
  - 0.5 … 5A ac
- Programmable settings
  - under or overcurrent, phase imbalance/failure
  - time delay, relay energize
  - time delay, relay de-energize
- Automatic reset
- (1) N.O. and (1) changeover contact

4.3 Thermistor monitors – 817S

http://www.ab.com/en/epub/catalogs/12768/229240/229258/3170949/1521151/tab3.html

Monitors that protect equipment from over temperature conditions for applications such as:

- Motors: VFD applications AND High ambient environment
- Bearings, Transformers, Heating systems

Type E1

- No settings necessary
- LED status indicator: Power-up indication AND Trip identification
- Automatic reset
- (1) N.O., (1) N.C. contacts

Type E2

- No settings necessary
- LED status indicator: Power-up indication AND Trip identification
- Automatic, manual or remote reset
- (2) N.O. contacts (independent relays)
- Unlimited status storage

5 Signaling Devices

http://ab.rockwellautomation.com/Push-Buttons-and-Signaling-Devices

5.1 70mm Control Tower™ Stack Lights - 855T

http://www.ab.com/en/epub/catalogs/12768/229240/229246/2531107/229856/

- UL Listed and rated Type 4/4X/13, IP65
- No-tools-required assembly
- Light or sound modules
- Light with sound modules
- Surface mounting or Pole Mounting
- Right angle / vertical mounting
- Socket mount LED's
- Wired or DeviceNet™ connectivity
- 24V DC
- Pre-assembled or as loose modules

5.2 50mm Control Tower™ Stack Lights - 855E

http://www.ab.com/en/epub/catalogs/12768/229240/229246/2531107/229864/

- Surface mounting where minimal height is required
- Pole mounting for increased visibility
- Side mounting for vertical equipment surfaces and walls
- Six lens colors: red, amber, green, blue, yellow, and clear
- LED in steady or flashing, and strobe
- Available pre-assembled or as individual modules
- UL rated Type 4/4X/13, and IP65, CUL, and CE listed
- Broad line of stack light products
  - Light modules, sound modules, or Light with sound modules
  - 13 base options
  - socket mount LED's
- Standard in 24V DC

5.3 70mm Control tower – 855F

http://www.ab.com/en/epub/catalogs/12768/229240/229246/2531107/7487004/

Allen-Bradley Compact Control Tower Stack Lights are now available in 70mm diameter. This new line is fully assembled, pre-wired and tested at the factory. In order to meet a wide range of signaling applications, LED light modules are offered in Steady and Flashing versions and sound modules in Pulsing and Steady versions. The 855F 70mm Compact Control Tower Lights are custom configured and offered in a wide range of mounting options, voltages, and colors.

Advantages

- UL Type 4/4X/13, IP65
- Configurable to up to 5 light modules, 4 light modules with a single-circuit sound module, or 3 light modules with a dual-circuit sound module
- Lens color matches LED color for improved optics. Available in six colors (Green, Red, Amber, Blue, Clear and Yellow)
- Piezo sound module (100dB @ 1 meter) available for continuous or pulsing sound
- Power bases available in 3 versions to meet most global applications: 24V AC/DC, 120V AC, and 240V AC
- Pre-wired bases for easier and safer installation
- Flexible mounting options including direct mount, vertical bracket, pole mount with foot, and surface mount
- Lenses and housings made of impact resistant polycarbonate
- cULus listed and CE marked

5.4 40mm and 60mm Control Tower – 854J, 854K

- 854J (40 mm) and 854K (60 mm)
  - Modular construction
  - cULus Type 4/4x/13, IP66
    - Indoor/ Outdoor use
  - Offered as separate components or as Pre-configured arrangements
  - features/options
    - Strobe LED
    - Multi flash Module
    - Double sided Base
    - Plastic Base Extension

http://ab.rockwellautomation.com/Signaling-Devices/854J-854K-Control-Tower-Stack-Lights

5.5 Horns – 855H

http://www.ab.com/en/epub/catalogs/12768/229240/229246/7804386/229860/

The Allen-Bradley Bulletin 855H offers multi-tone and volume control capabilities in each device. The horns are available as stand-alone devices or with high visibility beacons attached. All horns can be purchased with a combination strobe beacon available in 6 lens colors, allowing optional visual and audible signal combinations

5.6 Industrial Beacons - 855B

http://www.ab.com/en/epub/catalogs/12768/229240/229246/2531105/

Bulletin 855B — Mini Square Beacons

- High Intensity 5 Joule Strobe Beacon
- IP66/UL Type 13/3R

Bulletin 855BS/855BM/855BL — Round Beacons

- 6 Colors available
- LED functions:
  - Single color with user-selectable steady burning or flashing function
  - Three color (red, green, amber)
  - Strobe with user-selectable single or double flash
- Surface, NPT conduit, or Tube Mounting options
- Pre-existing functions:
  - Halogen functions: Steady, Flashing, or Rotating
  - User-selectable Rotation Speed (90 or 180 rpm) on Rotating version
  - Xenon function: Strobe
- UL Type 4/4X/13, IP65 except LED Beacons which are NEMA 4/4X/13, IP65

5.7 Bulletin 855P Panel Mount Alarms

http://www.ab.com/en/epub/catalogs/12768/229240/229246/229858/

The Allen-Bradley Panel Mount Alarms family offers a visual and acoustic signaling solution. Bulletin 855P panel mount alarms and the 855PD dual-circuit panel mount alarms offer a high level of environmental integrity to your panel with UL Type 4/4X/13, IP65 ratings.

Advantages

- Reduce panel space by 50% — ideal for applications with space restrictions
- Initial-buy and installed-cost savings by providing two independent signals in a single device (855PD)
- Mount in a standard 22.5 mm or 30 mm hole (with adapter ring)
- Selectable continuous or pulsing sounders and flashing or steady LED available
- Panel mount strobe light version available
- UL Type 4/4X/13, IP65 rated
- Sound output range from 80 dB to 103 dB @ 1 meter
- Adjustable volume
- Available in 24V and 120V other voltages available with extended lead time
- Finger-safe terminal block — IP2X rated
- Rear securing eliminates unauthorized product removal
- cULus listed and CE Marked

5.8 Bulletin 800F 22mm LED Illuminated & non-Illuminated Operators

http://ab.rockwellautomation.com/Push-Buttons/800F-Round-Push-Buttons

The 800F line of 22.5 mm push buttons is designed and manufactured to demanding performance specifications. Using state-of-the-art solid modeling techniques and finite element analysis, every component built into 800F Push Buttons is optimized for durability and performance.

Worldwide Solutions:

- Designed to World Wide Standards
- Operator caps, legend plates and inserts available with international symbols, foreign languages, and custom markings.

Durable Materials

- 800FP operators are made of industrial grade thermoplastic for superior chemical resistance.
- 800FM operators are constructed of tough die cast zinc alloy, finished with chromate plating.

Standard Operators
- IP 66 and Type 4/13
- Diaphragm seals
  - Most linear travel devices
  - No lubrication
- K-seals
  - Rotating devices such as twist-to-release E-stops and Selector Switches.
  - Dual wiping action
  - High pressure sealing

QuadCONNECT™ Contact Blocks – a Low Voltage Exclusive
- Direct drive mechanism
  - Positive actuation
- Independent and sequential operation of contact fingers
  - Minimized contact bounce
- Self-cleaning contact wiping
  - Increased contact reliability
  - Long life.
- Reliability operation in applications below 17V, 5 mA down to 5V, 1 mA

Selector Switches
- Rigid teeth
- Positive detent
- No hang-up between positions
- Constant energy solution
- Vibration insensitive

Self-Monitoring™ Contact Blocks
- Ensures NC contact opens when E-stop is actuated
- Monitors proper installation between:
  - Operator and latch
  - Latch and S.M.C.B.

6 Photoelectric Sensors

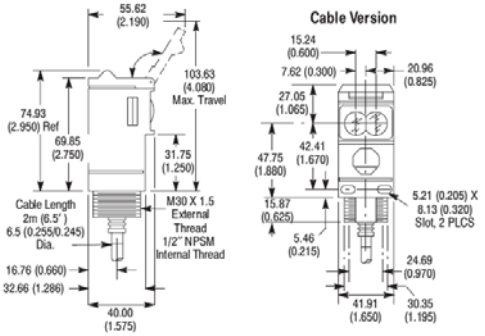
6.1 Photoelectric Sensors: Series 9000

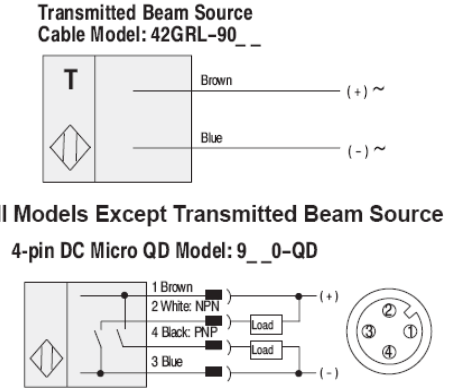
http://www.ab.com/en/epub/catalogs/2051089/6270353/6647249/6647253/8445690/

The Series 9000 photoelectric sensors are designed to perform in the harshest of industrial environments. The sensor will withstand 1200psi (8270kPa) high temperature, high pressure washdowns, commonly found in the food and beverage industry. All adjustments are made on a user interface panel located under the top, clear cover. This panel contains three LED status indicators highly visible from 360º around the sensor.

- 4-pin micro M-12 QD connector
- 10–30V DC, IP67 with LED indicators
- Harsh duty 30mm package
- Wide selection of sensing modes and operating modes
- Standard ON/OFF and timing versions, Fast response time
- Variety of connection types
- Time delay models offer additional application flexibility
- A unique, easy-to-use fiber optic cable locking mechanism speeds installation of fiber optic models
- On/Off Timing models available with a wide range of supply voltages

- Darkroom sensors for use in the manufacture of photographic materials
- DeviceNet™ network compatible offering direct connection to the Industry-standard device network
- Diagnostic models with a choice of Static or Dynamic diagnostic capability for best response
- NEMA 3, 4X, 6P, 12, 13, IP67

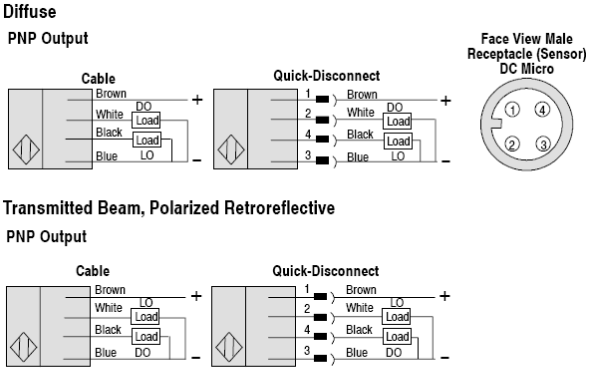




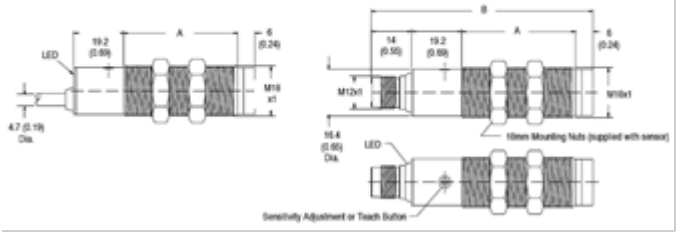
6.2 Photoelectric Sensors: LaserSight – 42CM

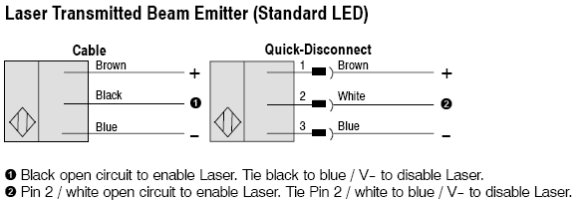
http://www.ab.com/en/epub/catalogs/2051089/6270353/6647249/6647253/8445682/

- Class 1 laser, Fast response time—less than 0.7ms
- Teach capabilities, Contrast Detection, Three sensing modes
- Error Proofing
- Small spot size—0.1mm @ 100mm sensing distance
- Metal housing for heavy duty industrial applications
- 18mm industry standard package, 30V DC operation
- NPN or PNP outputs
- 2m cable or micro QD connector
- CE or cULus marked, meets or exceeds IEC 60947-5-2



Dimension	Laser Receiver—mm (in)	Other Laser Models—mm (in)
A	42.7mm (1.68in)	57.5mm (2.26in)
B	82.8mm (3.26in)	97.7mm (3.85in)




Laser Transmitted Beam Emitter (Standard LED)
Cable
Quick-Disconnect
Brown
Black
Blue
White
❶ Black open circuit to enable Laser. Tie black to blue / V- to disable Laser.
❷ Pin 2 / white open circuit to enable Laser. Tie Pin 2 / white to blue / V- to disable Laser.

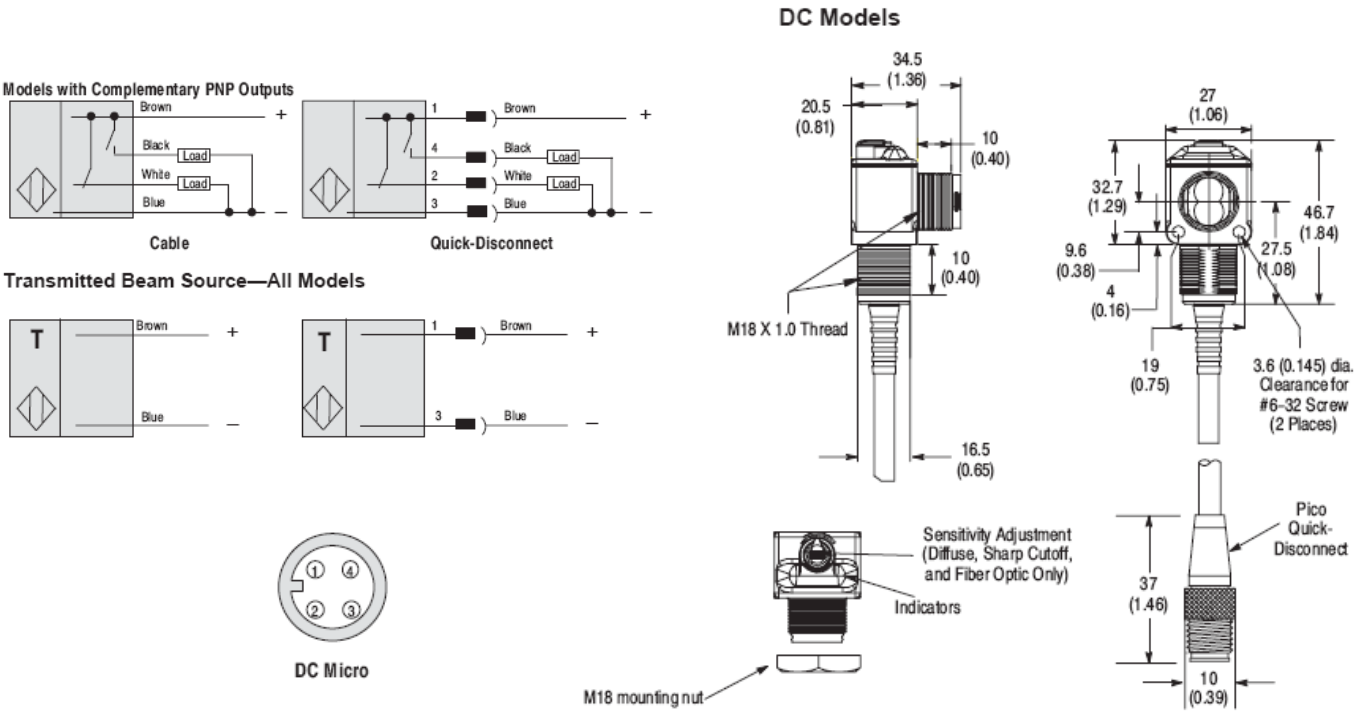
6.3 Photoelectric Sensors: RightSight - 42EF

http://www.ab.com/en/epub/catalogs/2051089/6270353/6647249/6647253/8444337/

Right-Sight sensors can be through-hole mounted flush against a mounting surface or

can be attached with an 18mm threaded mounting nose or base. Just 35mm (1.4in) deep, it can be used in many areas where industry-standard 18mm mounting is desired and a short mounting depth is required

- 4-pin micro M-12 QD connector
- 10–30V DC, with LED
- Compact right angle housing
- Flexible 18mm mounting options
- 1200psi washdown rating
- No user adjustments
- 360º visible LED indicators
- NEMA 4X, 6P, IP67
- Reverse polarity protection, Short-circuit protected outputs
- Fast 1ms response time (DC), False pulse protection



6.4 Photoelectric Sensors: MiniSight – 42KL

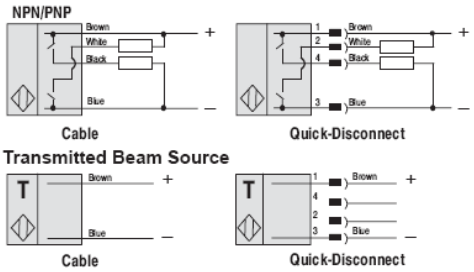
http://ab.rockwellautomation.com/Sensors-Switches/General-Purpose-Photoelectric-Sensors/MiniSight-Sensors

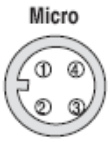
Mini-Sight photoelectric sensors are interchangeable with many other standard 18mm threaded barrel photoelectric sensors. These sensors can also be used where rugged performance is required. MiniSight sensors will withstand 1200 psi high pressure, 60°C (140°F) high temperature washdowns.

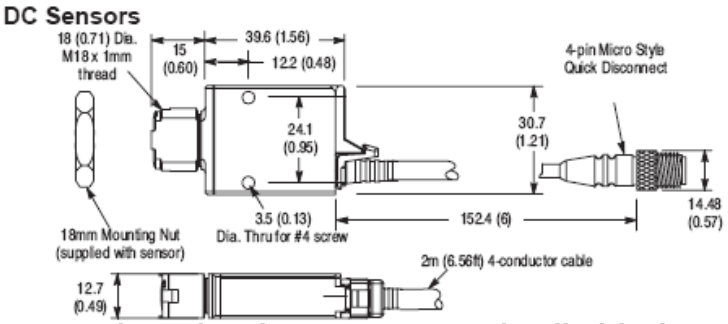
- 4-pin micro M-12 QD connector
- 10–30V DC, with LED indicators
- Compact rectangular size with standard 18mm mounting nose
- Visible indicators for power, output, and 2.5X margin/short circuit
- Short circuit protection in all versions, including two-wire universal voltage versions
- False pulse protection
- Switch selectable light or dark operation

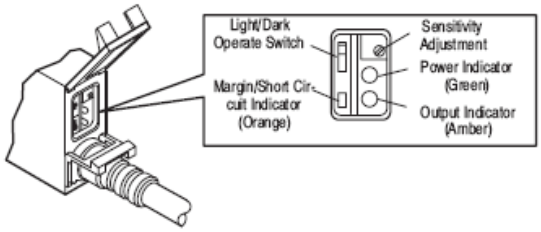
- Access to sensor adjustments through captive cover that does not require tools for access
- Eight sensing modes available
- Rated to withstand high temperature 1200 psi washdowns

- 300µs high speed DC versions









NOTE: The power indicator will turn off when the output indicator is on. The catalog number for the Rear Snap Cover is #60–2679.

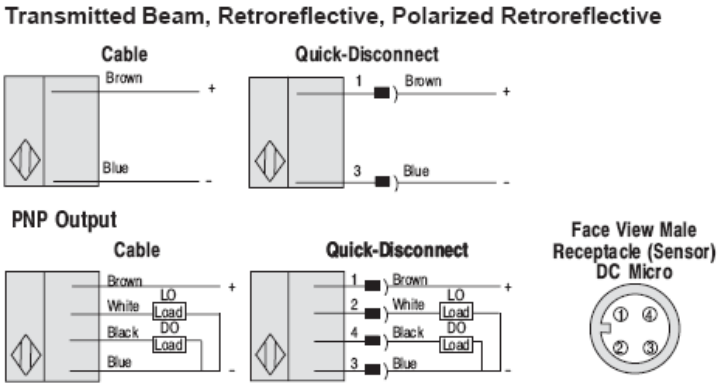
6.5 Photoelectric Sensors: Metal Cylindrical – 42CM (18mm), 42CF (12mm)

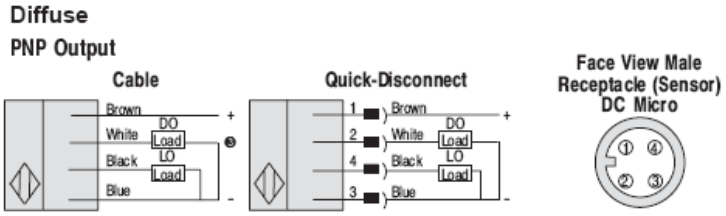
The 42CM and 42CF are metal body photoelectric sensors intended for heavy duty industrial applications. They are packaged in a rugged 18 mm or 12mm cylindrical housing.

6.5.1 18mm Metal Cylindrical – 42CM

http://ab.rockwellautomation.com/Sensors-Switches/General-Purpose-Photoelectric-Sensors/18-mm-Metal-Cylindrical-Sensors

- 4-pin micro M-12 QD connector
- 10–30V DC, IP67 with LED indicators
- 18mm industry standard package, IP67
- Wide selection of sensing modes
- Fast response time
- Background suppression available

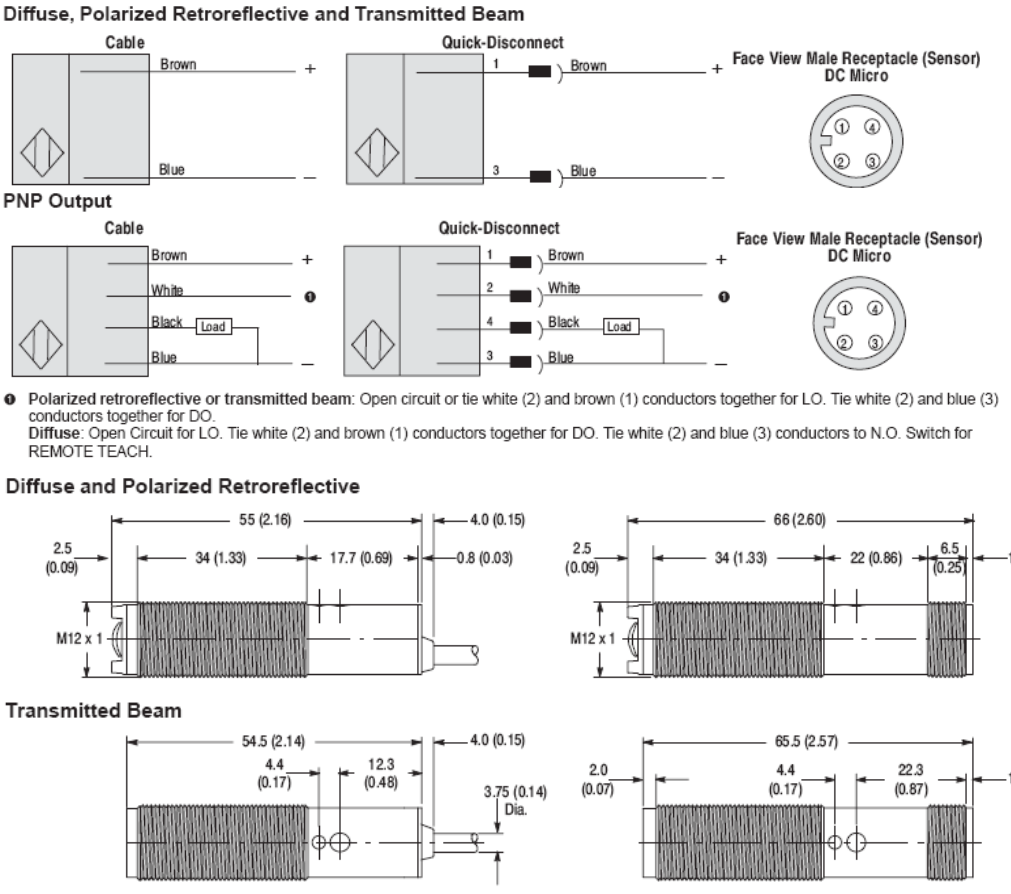




6.5.2 12MM Metal Cylindrical – 42CF

http://ab.rockwellautomation.com/Sensors-Switches/General-Purpose-Photoelectric-Sensors/12-mm-Metal-Cylindrical-Sensors

- 4-pin micro M-12 QD connector
- 10–30V DC, IP67 with LED indicators
- 12mm industry standard package, IP67
- Wide selection of sensing modes
- PNP outputs
- Fast response time
- Local teach button
- Accepts remote teach input



6.6 Photoelectric Sensors: Ultrasonic Sensor – 873P

http://ab.rockwellautomation.com/Sensors-Switches/Ultrasonic-Sensors/Analog-or-Discrete-Output-Ultrasonic-Sensors

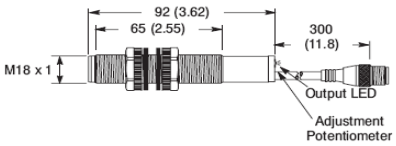
Bulletin 873P Programmable Ultrasonic Sensors are self-contained solid-state devices designed for noncontact sensing of solid and liquid objects. Available with a 30mm barrel diameter constructed from PBT plastic and meets IP67 enclosure

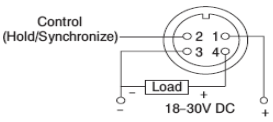
standards. Two programmable setpoints with sourcing (PNP) outputs that can be configured for N.O. or N.C. operation. They feature a 4–20mA or 0–10V DC analog output.

- 4-pin micro M-12 QD connector
- 10–30V DC, IP67 with LED indicators
- Sensing ranges from 150mm to 3500mm
- Programmable, Discrete and Analog models
- cULus listed and CE marked for all applicable directives
- Short circuit, overload, false pulse, transient noise and reverse polarity protection

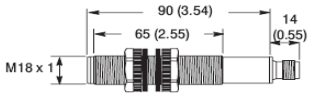
Chrysler Powertrain use Only
PNP Brown=Pos(+) Blue=Neg (-)
White= Hold Black=Load Load

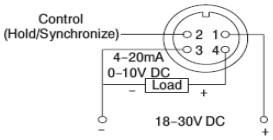
18mm Discrete



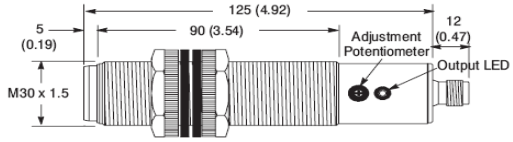


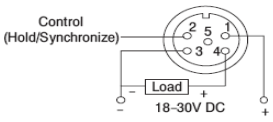
18mm Analog



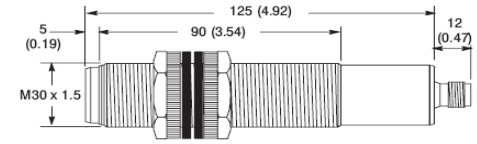


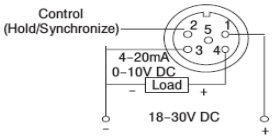
30mm Discrete



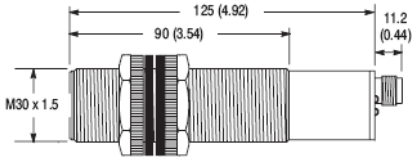


30mm Analog

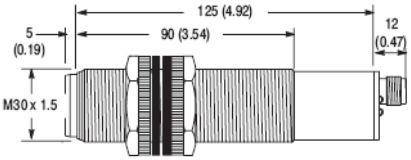




1500mm



3500mm



Pin	Function
1	19 to 30V DC Operating Voltage
2	Set point (P2)
3	0V DC
4	Set point (P1)
5	4–20mA or 0–10V DC (depending on model)

6.7 Photoelectric Sensors: Multi-Sight– 48-MS

http://ab.rockwellautomation.com/sensors-switches/photoelectric-vision-sensors/48ms-multisight-photoelectric-sensors

The MultiSight is an optical multi-pixel sensor with a pass/fail PNP output. The MultiSight uses three different methods of evaluation (pattern matching, contrast, and brightness) to detect or differentiate objects by means of previously defined optical characteristics, e.g. for separating “good” and “bad” parts.

- Stand-alone vision sensor
- Compact, sturdy industrial housing with IP67 rating
- Integrated lighting
- Adjustable focus from 20 mm to infinity
- Short evaluation time (50…100 ms)
- 3 evaluation methods: pattern matching, brightness, and contrast
- 10 virtual detectors
- Individual virtual detectors can be logically linked or grouped for evaluation of different objects with several characteristics for inspection
- Ethernet connection for setup

6.8 45LMS – Photoelectric Laser Measurement Sensor

http://ab.rockwellautomation.com/Sensors-Switches/Laser-Sensors/45LMS-Measurement-Laser-Sensors

Rockwell Automation is proud to introduce the 45LMS laser measurement sensor to its family. Available in three diff erent ranges: 8 m (26.25 ft) diff use, 15 m (49.21 ft) diff use and 50 m (164.04 ft) retroreflective, the Allen-Bradley® 45LMS utilizes the Time of Flight (ToF) principle and has a relatively small beam spot – even at 50 m away. Completely self-contained, this sensor does not require any external
control devices which add cost and require additional mounting space.

The 45LMS is easily set up by mounting the sensor such that the target is within the operating range of the sensor and teaching in the appropriate set-points required for the application. All sensors in this family have one discrete output with one analog output. The discrete output can be wired for either light operate (L.O.) or dark operate (D.O.) and the analog output is automatically scaled between the selected set-points with either a positive or negative slope.

The 45LMS is a great solution for long range detection/measurement for the following applications: distance measurement, verifying material position, stack level, thickness measurement, roll diameter, positioning fi xtures, error proofi ng inspection, long standoff distance presence/absence, level monitoring, crane crash protection and other diffi cult applications that exceed the capabilities of standard diff use or background suppression photosensors.

Features

- Eye Safe Class 1 or Class 2 laser (by model)
- Sensing ranges of 8 m (26 ft), 15 m (49 ft.) or 50 m (164 ft), dependent on model
- One discrete output (1 x NPN/PNP) and one analog output (1 x 4…20 mA)
- Accurate to ± 25 mm (± 0.98 in.)
- Fast response time of 10 ms
- Easy setup of switch points or analog scaling using programming buttons
- IP65 enclosure
- Self-contained sensor
- Operating temperature of -30…50° C (-22…122° F)

7 Encoders – 845H / 845T / 844D / 845G / 842D

7.1 Bulletin 845H High-Performance Industrial Incremental Encoder

http://ab.rockwellautomation.com/motion-control/high-performance-incremental-optical-encoder

The 845H provides forty-two code disk resolutions of up to 5,000 pulses per revolution and features state-of-the-art circuitry. The 845H is the industry standard Size 25 incremental encoder. With an electronic frequency response of 210 kHz, the 845H can provide 2,048 pulses per revolution at an operating speed of 6,000 revolutions per minute. Various output signal types are available in order to connect to a wide range of controllers.

7.2 Bulletin 845T Heavy-Duty Incremental Encoder

http://ab.rockwellautomation.com/Motion-Control/Heavy-Duty-Incremental-Optical-Encoder

The Bulletin 845T encoder is a heavy-duty, NEMA Type 4 and IP66-rated incremental shaft encoder that is housed in a compact, two-inch-diameter enclosure. The 845T provides code disk resolutions up to 3,000 PPR and a frequency response of up to 100kHz. Typical applications for the 845T include machine tools, packaging machinery, motion controls and robotics.

- Industry standard size 20, rugged, die-cast aluminum housing
- NEMA Type 4, & IP66 (IEC529) rated enclosure
- 15,000 RPM maximum slew speed
- Code disk resolution of up to 3,000 pulses per revolution
- Optional gated index
- Overvoltage and short circuit protection

7.3 Bulletin 844D Hollow-Shaft Incremental Encoder

http://ab.rockwellautomation.com/Motion-Control/High-Frequency-Incremental-Optical-Encoder

Bulletin 844D blind-shaft and through-shaft incremental encoders mount directly to the monitored shaft via a split collar clamp on the encoder, eliminating the need for mounting plates and flexible couplings. As a result, overall cost and size are reduced considerably. Through-shaft models are installed by inserting the monitored shaft completely through the encoder, while blind-shaft models only require insertion of the end of the shaft. Shaft position is converted to digital pulses in an “A quad B” format.

An important feature of the 844D is high frequency response: 300 kHz for line drivers up to 8,192 PPR and 600 kHz above 8,192 PPR. This allows both high resolution (10,000 and 16,384 PPR) and high shaft speed (over 2,000 RPM at 16,384 PPR).

7.4 Bulletin 845G Single-Turn Absolute Encoder

http://ab.rockwellautomation.com/Motion-Control/Single-Turn-High-Performance-Absolute-Encoder

The Bulletin 845G is a NEMA Type 4 and 13, single-turn absolute encoder that digitizes shaft position for reliable readouts under a wide range of harsh conditions. This family has been enhanced to include BCD and Natural Binary outputs, push-pull and SSI output configurations and an increased operating temperature of 85°C.

As an added convenience, the 845G incorporates a zero set pin. Most absolute encoders must be de-coupled from the monitored shaft to synchronize the electrical and mechanical zero or home positions. The 845G can be set to zero by connecting DC+ to the zero set pin.

7.5 Bulletin 842D DeviceNet™ Multi-Turn Absolute Encoder

http://ab.rockwellautomation.com/Motion-Control/DeviceNet-Multi-Turn-Magnetic-Absolute-

Bulletin 842D is a 26-bit absolute multi-turn shaft encoder offering direct connection to DeviceNet™ for advanced functionality with reduced wiring cost. This network capability eliminates the need for dedicated input cards and allows connection to the

DeviceNet™ trunk line via a low-cost five-pin micro quick disconnect. Up to sixty-three 842D DeviceNet™ encoders can be interfaced to a PLC or other logic system through a single network connection. Providing up to 8,192 counts per revolution (CPR) over a maximum of 8,192 turns, the 842D also incorporates advanced diagnostics and many programmable options.

- Eight programmable cam functions that set a bit when the position is within one of eight value ranges
- Programmable code direction (CW or CCW position increment)
- Offset value enables the user to reset the output in relation to the machine's mechanical position
- Output scaling, which lets you set the optimal counts per revolution for a particular application
- Rugged magnetic technology allows high-shock loading (100 g for 6 ms) and vibration (20 g at 10–2000 Hz)
- High temperature (85°C operating) and high humidity (98%) operation
- Multi-turn counting is accomplished through gearing and magnets
- Absolute position is saved on power failure without any battery back-up
- Change of State (COS) operating mode optimizes network bandwidth

8 Condition Sensing Switches and Controls

http://ab.rockwellautomation.com/Sensors-Switches/Temperature-Switches/Solid-State-Temperature-Switches

The Allen-Bradley Condition Sensing product family offers exceptional control for automatic operation of machines and processes. As the link in an electrical circuit, condition sensors supply control intelligence at important values and either communicate information to automatically sequence equipment or provide a signal to operators for manual operation. When properly applied, Allen-Bradley Condition Sensing devices can lower your total operating costs by helping to improve processes and systems, reduce downtime, protect expensive equipment, and safeguard operators.

Rockwell Automation knows that Condition Sensing controls are vital components in today's control systems. High-quality materials, outstanding workmanship, and rigid standards are combined to manufacture these highly reliable, world-class controls. Most devices are UL Listed, CSA Certified and CE Compliant.

8.1 Solid State Pressure Switch – 836E

http://ab.rockwellautomation.com/Sensors-Switches/Condition-Sensors

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions
- Operating pressures from --15…6,000 psi (gauge)
- Industry-leading four-digit 14-segment digital display
- Independently programmable dual PNP N.O./N.C.
- outputs or 4…20 mA analog output
- Stainless steel sensing element

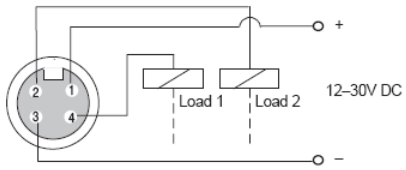
8.2 Solid State Temperature Switch – 837E

http://www.ab.com/conditionsensing/temperature/solidstate.html

- Microprocessor based with no moving parts
- Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating
- Media temperature range from -50° to 150° C (-58° to 302°F)
- Operating temperatures from -25° to 85° C (-13° to 185°F)
- Industry-leading four digit 14-segment digital display
- Dual NO/NC independently programmable PNP outputs
- Stainless steel probe

Chrysler Powertrain use Only PNP
Brown=Pos(+)
Blue=Neg (-)
White= Load NC

Wiring Diagram



Note: Output 2 operates as diagnosis/break contact in "DESINA" mode.

8.3 Flow Switch – 839E

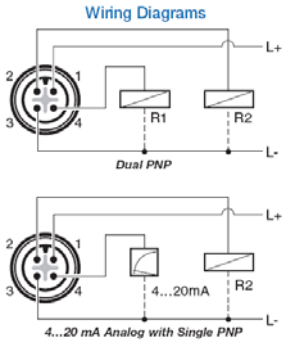
http://ab.rockwellautomation.com/Sensors-Switches/Flow-Switches

Applications include Coolant Systems, Liquid Media, and Hydraulics

- cULus, CE marked for all applicable directives, and 3 A authorized only with sanitary adaptor
- Microprocessor based with no moving parts for longer life and reduced downtime
- Corrosion resistant 316 stainless steel housing features an IP 68 enclosure rating
- Flow rates of liquid media (calorimetric measuring principle) in the range from 0.03-3 m/s (0.1…9.84 ft/s)
- Industry leading four-digit 14-segment digital display
- Dual NO/NC programmable PNP outputs or 4…20 mA analog output with single PNP output
- Stainless steel probe

Chrysler Powertrain use Only PNP
Brown=Pos(+)
Blue=Neg (-)
White= Load NC

Wiring Diagrams



8.4 Speed Sensing Switches

http://ab.rockwellautomation.com/Sensors-Switches/Speed-Sensing-Switches/808-Speed-Sensing-Switches

Bulletin 808 Speed Sensing Switches

Allen-Bradley Bulletin 808 Speed Switches provide flexibility for the basic functions required of rotating machinery. Mechanically connected to a machine, these devices provide an electrical contact signal at a determined speed for plugging, anti-plugging, speed sensing and direction of rotation.

Standard Features

- Speed setting from 15 - 1,000 RPM

- Shaft speeds up to 2,000 RPM
- Double-shaft seal with long-life precision bearings
- Four mounting arrangements
- Safety lock-out solenoid available
- Available in Type 1, 4/13 and enclosures
- A superior design withstands the toughest applications. This line of products is not affected by switching due to noise and spurious transients from AC or DC supplies.

Typical Applications

- Machine tools
- Conveyor sequence
- Fan/pump rotation
- Arrays

8.5 Part Verification Arrays for Bin-Picking Applications - 45PVA

http://ab.rockwellautomation.com/sensors-switches/light-arrays/part-verification-photoelectric-sensors

Allen-Bradley 45PVA designed for bin picking and object detection applications. The 45PVA is a direct response to the error-proofing measures and it effectively prevents mis-picks. The 45PVA uses transmitted beam technology to create a light screen that can be spanned across bins. By mounting the separate emitter and receiver units on each side of a bin entry and wiring the receiver output into a controller programmed with the necessary logic, a virtually error-free bin-picking process can be achieved. 'Job lights' on the 45PVA will show the assembler the bins required to complete the current process and will also indicate the correct picking sequence. In the event the assembler attempts to pick an incorrect part, a warning light on the 45PVA will illuminate to indicate the error; additional fault enunciation can be achieved via controller logic in conjunction with a tower light or audible alarm.

- Robust metal enclosure with slim 13mm profile
- Large highly-visible job indicator lights
- Optional Red warning light indicator
- Dip switch selectable lighting operation for job lights
- 4, 9, 12, 15 inch sensing heights
- 2m Sensing range, 35 mm res.
- 25- 60ms response time
- 12-24 VDC operation
- 2m Cable or 4 Pin Micro QD
- DeviceNet Compatible

8.6 Area Array Two dimensional scanning technology – 45AST

http://ab.rockwellautomation.com/Sensors-Switches/Light-Arrays/Area-Photoelectric-Sensors

The Allen-Bradley 45AST Area Array is a compact nonsafety light screen for small part detection and assembly applications. By installing a 45AST emitter/receiver pair across each bin, interfacing the area array to a controller and adding job lights or acoustic alarms, an error-free bin picking operation can be established that sounds alarms in the event of a mispick or provides visual indication for proper sequencing. "Two-Dimensional Array Scanning Technology" allows the 45AST to sense an object regardless of its orientation provided that one axial dimension meets the minimum resolution requirements.

- Introduces Two-Dimensional Array Scanning Technology
- PNP Output
- Sensing ranges up to 2m (6.5ft)
- IP67 rated housing
- CE marked for all applicable directives
- Easy bracket-free mounting
- Highly visible alignment LEDs

9 Circuit & Load Protection

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

9.1 Motor Protection Breaker & Circuit Protectors

9.1.1 Motor Protection Circuit Breaker: 140MG

Bulletin 140MG Motor Circuit Protectors are available for a wide range of motor sizes and installation types. Combine these circuit breakers with our NEMA and IEC motor starters, overload relays, and contactors.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Motor-Protection/140MG-Motor-Circuit-Protectors

General Information

Motor Circuit Protectors may provide the following protective and control functions.

- Disconnect for Motor Branch Circuit
- Branch-Circuit, Short-Circuit Protection (Magnetic Protection)
- Switching (Manual)

In North America, electrical codes require that an individual Motor Branch Circuit be protected by a UL/CSA Listed Fuse, Circuit Breaker or Self-Protected Combination Motor Controller.

Features

- Includes current range of 3…1200 A
- UL 489 listed/recognized for motor loads
- Offers short-circuit only protection units in 3…1200 A
- Offers combined short circuit and overload protection units in 3…150 A
- Provides high current limiting and high switching capacity
- Visible trip indication
- High current limiting
- High switching capacity
- Shares wide range of accessories with Bulletin 140G molded case circuit breakers
- Can be applied with NEMA and IEC contactors and overload relays

Products

- 140MG Motor Circuit Protectors, G-Frame
- 140MG Motor Circuit Protectors, H-Frame
- 140MG Motor Circuit Protectors, I-Frame
- 140MG Motor Circuit Protectors, J-Frame
- 140MG Motor Circuit Protectors, K-Frame

- 140MG Motor Circuit Protectors, M-Frame
- 140MG Motor Circuit Protectors, N-Frame

Certifications

CE Marked, cULus Listed, CCC, CSA Certified

Accessories

We offer a variety of accessories for your 140MG Motor Protection Circuit Breakers, including:

- Auxiliary and trip contacts
- Operating handles

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229469/12526041/Quick-Selection.html

9.1.2 Motor Protection - Molded Case Circuit Breakers: 140U-D

Bulletin 140U-D Molded Case Circuit Breakers are UL489 listed for global applications. These circuit breakers are current limiting and provide fixed short circuit and overcurrent protection. They offer high interrupting ratings for 2- and 3-pole devices.

http://ab.rockwellautomation.com/circuit-and-load-protection/circuit-breakers/140u-circuit-breakers

Features

- Available in 0.5...30 A current range
- Provides 100% rating up to 15 A
- Suitable for back feeding at 240V and 480Y/277V
- Smaller footprint to reduce panel space

Products

- 140U Molded Case Circuit Breakers, D-frame

Certifications

- UL 489 Listed, CSA Certified

Certifications apply when product is marked. See our Product Certification site for Declarations of Conformity, certificates and other certification details.

Accessories

We offer a variety of accessories for your 140U D-Frame Molded Case Circuit Breakers, including:

- Compact busbars
- Eco connection modules
- Extension shaft support
- Feeder terminal for compact busbars
- Flexible wire modules
- Load terminal covers

http://www.ab.com/en/epub/catalogs/12768/229240/229254/305540/10913298/Accessories.html

9.1.3 Motor Protection Circuit Breaker: 140-M

Bulletin 140M Motor Protection Circuit Breakers can provide disconnect for motor branch circuit, branch-circuit and short-circuit magnetic protection, overload thermal protection, and manual switching. We offer multiple frame types to meet

your particular needs. Our factory-installed internal accessories make installation and wiring easy.

http://ab.rockwellautomation.com/allenbradley/type.page?RAProductId=140M+IEC+Circuit+Breakers&G11N/Locale=en

Features

- Offers short-circuit protection
- Offers visible trip indication
- Includes high current limiting
- Provides high switching capacity
- Available in C-, D-, and E-Frame sizes

Products

140M Motor Protection Circuit Breakers

- Provides current range 0.1…630 A
- cULus Listed as manual self-protected combination motor controller and as a manual motor controller which includes thermal overload protection

140M Motor Circuit Protectors

- Provides current range 0.16...1200 A
- cULus Listed as a manual motor controller where overload protection must be provided separately

Certifications

CE Marked, cULus Listed, CCC, CSA Certified

Accessories

We offer a variety of accessories for your 140M Motor Protection Circuit Breakers, including:

- Adapters
- Auxiliary, alarm, and trip contacts
- Busbars, feeder blocks, and feeder terminals
- Coil and connecting modules
- External operating handle
- Operating mechanisms
- Phase barriers
- Shunt trips and undervoltage releases
- Terminal lugs

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229469/3100802/tab8.html

9.2 Supplementary Protection

9.2.1 Supplementary Protectors: 1492-SPM

**** Note: Bulletin 1492-SPM family of supplementary protectors replaces Bulletin 1492-SP family of supplementary protectors. ****

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/1492-Supplementary-Protectors#

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

Bulletin 1492-SPM thermal magnetic Supplementary Protectors provide overcurrent protection for equipment where branch circuit protection is already provided, or is not required. These devices are also Miniature Circuit Breakers as defined by IEC Standards.

These supplementary protectors are offered as a broad portfolio of pole variants, current ratings, and trip curves to match the appropriate level of protection for your application. They may be used with UL 508 Listed bus bars for convenience in panel assembly, a wide range of left-, right- and space saving bottom-mount accessories, and lock out attachments for safety during maintenance..

9.3 Fuse Holders

9.3.1 Fuse Holders: 1492-FB

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/1492-FB-Fuse-Holders

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

Class CC and J holders are UL listed for branch circuit protection in electrical distribution systems. Midget holders are UL recognized. The Bulletin 1492-FB provides IP2 dead-front construction and is designed to be IEC 529 finger-safe.

- EN/IEC 60529 Finger Protection — Dead Front Construction
- Handle Design Isolates the Fuse from Power When Opened for Fuse Insertion or Removal
- Compact Size Requiring Less Panel Space than Open-style Fuse Holders
- Optional Blown Fuse Indicators
- Easy Insertion/Removal of Fuses, No Special Tools Required
- Mounts on Standard 35 mm DIN Rail (A-B p/n 199-DR1

9.3.2 Fuse Holders: 140F

Bulletin 140F Fuse Holders are available for UL Class CC or Midget Fuses and IEC 10 x 38 mm fuses, with or without blown fuse indication. They are lockable in the open position and compatible with Bulletin 140M accessories.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/140-F-Fuse-Holders

Features

- Compact busbar and connectors for Bulletin 100-C and 100-K contactors
- 1 N.O./1 N.C. Auxiliary Contact—late make N.O., early break N.C.
  - Provides capability for dropping out contactor before breaking current on fuses
  - Late make N.O. contact provides positive indication that power circuit is open

Products

- 140F Fuse Holders

Certifications

- IEC, CE Mark, UL, CSA

9.4 Industrial Din Rail Circuit Breakers

9.4.1 UL 489 Circuit Breakers: 1489-A

Bulletin 1489-A Industrial DIN Rail Circuit Breakers are listed for branch circuit applications in the United States and Canada and approved as miniature circuit breakers for IEC applications. We have a variety of configurations with current ranges of 0.5…40 A and voltage ranges of 240V AC and 480Y/277V AC.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/1489-Industrial-DIN-Rail

Features

- Energy-limiting design protects downstream during short circuits
- Field-mountable options for selective applications
- IP2x finger-protection (front)
- Trip-free mechanism (breaker operation cannot be defeated by holding the handle in the ON position)
- Time delay (D characteristic) for high inrush currents during inductive start-ups
- Mounts on DIN rail
- Wire connect, line and load (reversible)
- Optional terminals for ring lug terminals

Products

- 1489-A Industrial DIN Rail Circuit Breakers

Certifications

- UL, CSA

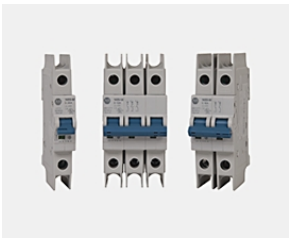
Accessories

We offer a variety of accessories for your Industrial DIN Rail Circuit Breakers, including:

- Auxiliary/signal contacts
- Bus bars
- Lockout attachment
- Shunt trip modules

http://www.ab.com/en/epub/catalogs/12768/229240/471158/1213081/5725120/tab5.html

9.4.2 Thermal Magnetic Circuit Breakers: 1489-M



Bulletin 1489-M Thermal-magnetic Circuit Breakers are UL 489 Listed for branch circuit protection in the United States and Canada, and they are certified as Miniature Circuit Breakers for IEC applications. These circuit breakers are compatible with many accessories to meet diverse application needs, including UL 508 Listed bus bars for convenience in panel assembly, auxiliary contacts, signal contacts and shunt trips for versatility, lockout attachments for safety during maintenance, ideal for extreme ambient conditions, feature fast breaking time, and superior shock and vibration resistance.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/1489-Thermal-Magnetic

Features

- Includes 0.5…63 A miniature circuit breakers
- Available in 1-, 2- and 3-pole versions
- Provides C and D trip curves
- Current limiting

- Offers dual terminals for wiring and bus bar flexibility
- Includes reversible line and load connections
- Dual terminals allow a more secure connection of two wires, or both a wire and bus bar
- Terminal design helps prevent wiring misses by directing wires into the terminal openings, even while tightening
- Fast breaking time
- High rated voltage
- Superior shock and vibration resistance to help prevent nuisance tripping
- Single and multi-pole toggle mount lock out attachments available for Lockout/Tagout (LOTO)
- Fully recyclable device
- Suitable for extreme ambient conditions

Products

- 1489-M Thermal-magnetic Miniature Circuit Breakers

Certifications

- UL Listed, CSA Certified, CE Marked, VDE Certified, CCC Certified, RoHS Compliant

Accessories

We offer a variety of accessories for your 1489-M Thermal-magnetic circuit breaker, including:

- Auxiliary contacts
- Shunt trips
- Signal contacts
- Toggle mount

http://www.ab.com/en/epub/catalogs/12768/229240/471158/1213081/5725120/Accessories.html

9.5 Molded Case Circuit Breakers

**** Note: Bulletin 140G family of molded case circuit breakers replaces the Bulletin 140U family of molded case circuit breakers frames . ****

Molded Case Circuit Breaker Engineering Assistant Tool — This tool provides cross-reference details, CAD drawings, installation instructions, and trip curves to support your migration from our Bulletin 140U to our Bulletin 140G Molded Case Circuit Breakers.

https://download.rockwellautomation.com/esd/ocx.aspx?sdrsid=S16016#

9.5.1 Molded Case Circuit Breaker: 140G

Bulletin 140G Molded Case Circuit Breakers have eight different frame sizes with a range of 10...3000 A to accommodate your required current ratings and breaking capacities. With a wide range of operators and accessories, these circuit breakers provide the protection of circuits against overload, short circuit, and ground fault.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/140G-Circuit-Breakers

Features

- Offers 3- and 4-pole versions to support worldwide application
- Includes high interrupting ratings in compact dimensions from 18...100 kA
- Improved Short Circuit Coordination (G and I Frames now have Type 2 Coordination)
- New technology enables quicker clearing of higher level faults, at higher voltages than the 140U
- Offers a wide range of operating mechanisms to fit a variety of panel configurations

- Provides greater customization in trip units
- Offers a wide range of accessories for global availability (Field Installed)
- More termination options
- Includes globally rated and RoHS compliant

Products

140G Molded Case Circuit Breakers, G-Frame
140G Molded Case Circuit Breakers, H-Frame
140G Molded Case Circuit Breakers, I-Frame
140G Molded Case Circuit Breakers, J-Frame
140G Molded Case Circuit Breakers, K-Frame
140G Molded Case Circuit Breakers, M-Frame
140G Molded Case Circuit Breakers, N-Frame
140G Molded Case Circuit Breakers, NS-Frame
140G Molded Case Circuit Breakers, R-Frame

Certifications

CE Marked, CSA Certified, UL Listed, CCC

Selection

http://literature.rockwellautomation.com/idc/groups/literature/documents/sg/140g-sg001_-en-p.pdf

Accessories

http://www.ab.com/en/epub/catalogs/12768/229240/229254/305540/12391079/Accessories.html

9.6 Electronic Circuit Protection

9.6.1 Electronic Circuit Protection: 1692

Bulletin 1692 Electronic Circuit Protection Modules protect the secondary circuits of 24V DC switched mode power supplies. These modules monitor both supply voltage and load currents, and you can monitor and control the modules both locally and remotely.

Designed for 24VDC circuits, the 1692 provides comprehensive protection against short circuit and overcurrent conditions while allowing for inrush current.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/1692-Electronic-Circuit-Protection-Module

Explore this interactive demonstration to compare the performance of Bulletin 1692 Electronic Circuit Protection modules to thermo-magnetic circuit breakers in various fault scenarios on a control circuit. Learn how electronic circuit protection can help you more effectively protect your devices against short circuits and overloads, as well as avoid nuisance tripping.

On-Line Demo:

http://www.rockwellautomation.com/resources/downloads/rockwellautomation/multimedia/products-technologies/circuit-and-load-protection/electronic-circuit-protection/index.html

Features

- Allows less "let-through" energy than non-limiting circuit breakers
- Uses output circuit indicators to indicate the presence of affected circuits for rapid troubleshooting and correction
- Provides ON/OFF and reset buttons
- Offers certified Class 2 circuits (on select devices only)
- DIN Rail mountable
- Input voltage monitoring
- Current monitoring and limitations of the 4 outputs

- Fast tripping

Products

- 1692-ZG Electronic Circuit Protection Modules
- 1692-ZRCLSS NEC Class 2 Electronic Circuit Protection Modules

Certifications

- UL, NEC Class 2 (on select devices only), CE

9.7 Residual Current Device

9.7.1 Residual Current Devices: 1492-RCDA

Bulletin 1492-RCDA Residual Current Devices detect and interrupt leakage to the ground, helping you prevent injury to exposed personnel and damage to equipment. Use these devices with miniature circuit breakers for additional circuit protection from overload, short circuit, and ground fault.

RCDs are used in series with miniature circuit breakers for additional circuit protection from not only overload and short circuit, but also ground fault. Many short circuits begin as undetected ground faults. Using an RCD in an application may detect problems before costly equipment damage and downtime occurs.

These devices are Type A Residual Current Devices to IEC Standards.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Circuit-Breakers/1492-Residual-Current-Devices

Features

- Provides 25…80 A residual current devices
- Includes 2- and 4-pole versions
- Includes 30 mA sensitivity devices for personnel protection
- Includes 100, 300 and 500 mA sensitivity devices for equipment protection
- Offers reversible line and load connections
- Provides protection against current leakage to ground (earth) caused by an insulation loss between a live conductor and an exposed conductive part (such as an abraded wire, or a grounded person touching the live conductor)
- Suitable for protection against AC and pulsating DC (rectified AC) earth leakage current
- Dual terminals allow a more secure connection of two wires, or both a wire and bus bar

Products

- 1492-RCDA Residual Current Devices

Certifications

- cURus Recognized, CE Marked, CCC Certified, VDE Certified, RoHS Compliant

Accessories

We offer a variety of accessories for your 1492-RCDA Residual Current Devices, including:

- Auxiliary contacts
- Bus bars

http://www.ab.com/en/epub/catalogs/12768/229240/471158/3282061/Accessories.html

9.8 Overload Relays

http://www.ab.com/en/epub/catalogs/2051089/6270353/6647239/5920799/5922015/

9.8.1 Thermal Overload Relays

9.8.1.1 IEC Bi-Metallic Overload Relays: 193-T1

Bulletin 193-T1 IEC Bimetallic Overload Relays are designed for use with Bulletin 100-C Contactors and Bulletin 104-C Reversing Contactors.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Motor-Protection/193CT-193T1-Overload-Relay

Features

- Phase-loss protection
- Ambient temperature compensation
- Trip class 10/10A
- Auxiliary contacts (1 N.O. and 1 N.C.)
- Test function for auxiliary contacts
- Manual/automatic reset mode
- Trip indicator
- Optional remote reset solenoid and external reset accessories
- Available only in IEC configurations

Products

- 193-T1 Overload Relays

Certifications

- cULus, CE marked

Accessories

We offer a variety of accessories for your 193-T1 Bimetallic Standard Overload Relays, including:

- Adapters
- External reset buttons
- Label sheets
- Marking tag sheets
- Remote reset solenoids
- Reset adapters and rods
- Transparent covers

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229467/8540208/Product-Selection.html

9.8.1.2 IEC Miniature Bi-Metallic Overload Relays: 193-K

Bulletin 193-K IEC Mininature Bimetallic Overload Relays are designed for use with Bulletin 100-K Contactors and Bulletin 104-K Reversing Contactors. These thermal overload relays include a differential mechanism for sensitivity to phase-loss conditions.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Motor-Protection/193K-Overload-Relay

Features

- Standard protection for AC and DC motors
- Phase-loss sensitivity

- Ambient temperature compensation
- Trip class 10A
- Auxiliary switches (1 N.O. and 1 N.C.)
- Available only in IEC configurations

Products

- 193-K Bimetallic Overload Relays

Certifications

- CE marked, cULus Listed

Accessories

We offer a variety of accessories for your 193-K Bimetallic Miniature Overload Relays, including:

- External reset buttons
- Overload relays
- Remote reset solenoids
- Reset adapters

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229467/8339426/Product-Selection.html

9.8.2 Electronic Overload Relays

9.8.2.1 Electronic Overload Relays: E300

Bulletin 193 and 592 E300™ Electronic Overload Relays offer a modular design, communications options, simplified wiring, and Logix integration. The E300 overload relays provide flexibility to reduce engineering time and maximize uptime for motor control in an automation system.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Motor-Protection/E300-Overload-Relays

Features

- Modular design for exact application needs
- Simplified Logix Integration
- Simplified wiring between overload relay and 100-C contactor
- Dual port EtherNet/IP

Products

- Customize the E300™ Overload Relay by selecting one each of the following modules:
  - 193-ECM E300 Communication Module
  - 193-EIO E300 Control Module
  - 193-ESM or 592-ESM E300 Sensing Module

Certifications

- CE, cULus Listed, C-Tick

Accessories

We offer a variety of accessories for your E300™ Solid-state Overload Relays, including:

- Bus cables
- Control operator station
- Digital I/O (24V DC, 120V AC, 240V AC)
- Power supply (120/240V AC, 24V DC)
- Replacement connectors

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229467/12368361/Product-Selection.html

9.8.2.2 Electronic Overload Relays: E1 Plus

Bulletin 193 IEC and 592 NEMA E1 Plus Electronic Overload Relays are accurate and reliable. They are durable, flexible to fit most applications, and easy to install. Through optional side-mount modules, you can expand communication and protection.

http://ab.rockwellautomation.com/Circuit-and-Load-Protection/Motor-Protection/E1-Plus-Overload-Relays

Current measurement-based protection

While electromechanical overload relays pass motor current through heating elements to provide an indirect simulation of motor heating, the E1 Plus Overload Relay directly measures motor current. Current measurement-based overload protection more accurately models a motor's thermal condition. Furthermore, ambient temperature does not impact the performance of current measurement-based designs over the specified temperature operating range.

Electronic design

Thermal modeling is performed electronically with precision solid-state components, where at the heart of the E1 Plus Overload Relay is an application-specific integrated circuit (ASIC). The ASIC continually processes motor current data to accurately maintain the time-current status of the motor thermal capacity utilization value.

Thermal memory

A thermal memory circuit allows the E1 Plus Overload Relay to model the heating and cooling effects of motor on and off periods. This ensures accurate protection for both hot and cold motors.

Enhanced phase loss protection

A separate phase loss detection circuit incorporated into the E1 Plus Overload Relay allows it to respond quickly to phase loss conditions; typical reaction time is 3 seconds.

Features

- Self-powered
- Phase-loss protection
- Wide current adjustment range (5:1)
- Enhanced protection modules available
- EtherNet/IP™ and DeviceNet™ communication options available

E1 Plus Solid-State Overload Relays

- Over-molded power connections
- 1 N.O. and 1 N.C. isolated auxiliary contacts (B600 Rated)
- Low energy consumption (150 mW)
- Ambient temperature compensation
- Visible trip indication

193-ED version offers:

- 0.1…45 A current range
- Fixed Trip Class 10
- Manual reset

193-EE version offers:

- 0.1…800 A current range
- Selectable Trip Class (10, 15, 20, or 30)
- Selectable manual/auto-manual reset
- Single- and three-phase devices

Products

- 193 IEC and 592 NEMA E1 Plus Solid-state Overload Relays

Certifications

- IEC: CE, cULus Listed, C-Tick, CCC
- NEMA: cULus Listed

Accessories

We offer a variety of accessories for your E1 Plus Solid-state Overload Relays, including:

- Core balanced ground fault sensors
- Current adjustment shields
- DeviceNet™ configuration terminals
- DIN rail/panel adapters
- External reset adapters and reset buttons
- Remote reset solenoids
- Side-mount expansion modules
- Terminal covers and lugs

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229467/2442188/Product-Overview.html

10 Relays & Contactors

10.1 Relays

10.1.1 Control Relays: 700-P

The Bulletin 700-P family of relays has 4 types of contact cartridges. Different cartridges can be combined into one relay to yield a custom-tailored application solution. Time delay, latching attachments, overlapping and logic reed contacts are available.

Bulletin 700-P relays use standard (10A) contact cartridges with a double-break and bifurcated design. These relays are supplied with a max. of 12 contacts (max. 8 N.C.).

Bulletin 700-PK master control relays contain (20A) master contact cartridges with large single-contact pads on each side of the spanner for twice the current rating to control heavy loads and for master control of a system. These relays are supplied with a max. of 12 contacts (max. 8 N.C.). Time delay and latching attachments are available.

Bulletin 700-P and -PK relays combine convertible contacts with Direct Drive, a construction designed to maintain non-overlap operation between N.O. and N.C. contacts (within published ratings).

Bulletin 700-PH relays contain (35A) tandem contact cartridges. A jumper kit (Cat No. 700-CPH) allows two (20A) master contact cartridges to be connected in parallel. A maximum of six poles are supplied, up to four of which can be normally closed. Time delay and latch attachments are available.

http://ab.rockwellautomation.com/Relays-and-Timers/NEMA-Heavy-Duty-Relays

Features

- Rugged construction

- NEMA and IEC ratings, 600V maximum AC/DC
- Accessories include: adder decks, time delay, latching, surge suppressors, mounting strip
- For machine tool and other heavy-duty applications
- Can accommodate ring tongue terminals
- Integral DIN Rail adapter on AC relays
- Finger-safe protection standard
- Expands Safety Relay Outputs

Products

700-P NEMA Heavy-duty Relays

- Standard contact cartridges (10 A) with a double-break and bifurcated design
- Up to 12 poles, convertible to N.O. or N.C. (8 N.C. maximum)

700-PH NEMA Heavy-duty Relays

- Tandem contact cartridges (35 A)
- Up to 6 poles, convertible to N.O. or N.C. (4 N.C. maximum)

700-PK NEMA Heavy-duty Relays

- Master contact cartridges (20 A)
- Up to 12 poles, convertible to N.O. or N.C. (8 N.C. maximum)

Certifications

- cULus Listed, ABS (American Bureau of Shipping) certified

Accessories

We offer a variety of accessories for your 700-P Heavy-Duty Relays, including:
- Adder decks
- Contact cartridges
- Finger-safe cover accessories
- Mechanical latch units
- Relay rails
- Remote potentiometers
- Pneumatic time-delay units

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229661/3087128/229735/Introduction.html

10.1.2 Control Relays: 700-CF, 700S-CF

The Bulletin 700-CF range of 4-pole relays is also available in an 8-pole safety version (700S-CF)

Mechanically linked contacts: Allows detection of a welded contact condition. Mechanically linked contacts prevent the reclosing of the N.C. contacts if a N.O. contact has welded.

Double-Break Contacts: Has greater DC load breaking capability and better isolation. It provides separation of N.O. and N.C. circuits, unlike standard “Form C” contacts. Double-break contacts open the circuit in two places, creating two air gaps.

Bulletin 700S-CF Safety Control Relays provide mechanically or mirror contact performance, which are required in feedback circuits for safety applications. Bifurcated contacts are ideal for low energy feedback safety circuits where high contact reliability is required.

http://ab.rockwellautomation.com/Relays-and-Timers/IEC-Industrial-Relays

Additional Features and Options

- Coil voltages from 12…600Vac and 6…600Vdc
- Switch from 5…600Vac and Vdc, Switch from 1mA… 35A
- Front and Side Mounted Auxiliary contacts
- Solid State Pneumatic Timing Modules
- Common accessories with Bulletin 100-C contactors
- IEC 947-5-1, EN 50011, EN 5005, EN 50022, UL508, VDE 0660, CSA C22.2 Part 14
- CE, CSA, UL listed (File E14840, Guide NKCR), SUVA

Safety Applications

- Safety relay output – to expand the current rating or contact life of a safety relays
- Master Control Relays (switching PLC power supplies)
- E-STOP relays, Light curtain monitoring, Press control

Products

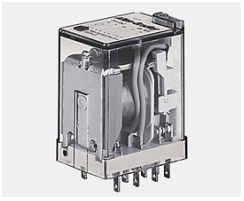
700-CF

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229661/3087130/229731/Product-Selection.html

700S-CF

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229661/3087130/229737/Product-Selection.html

10.1.3 Solid State Miniature Square Base Relays: 700-HC



Bulletin 700-HC Miniature Square Base Relays are 4-pole plug-in relays for your low-energy switching applications.

http://ab.rockwellautomation.com/Relays-and-Timers/Miniature-Ice-Cube-Relays

Features

- Blade-style terminals
- 7 or 10 A contact ratings
- Standard ON/OFF flag indicator
- Electrical schematic on faceplate, clear cover for visual inspection
- Incorporated manual override lever (-3 option) with the existing push-to-test button
- Optional lighted status indicator, push-to-test and manual override

Products

- 700-HC Miniature Square Base Relays

Certifications

- cULus, CE, ABS, IMQ, RINA

Accessories

We offer a variety of accessories for your 700-HC Miniature Ice Cube Relays, including:

- DIN (#3) Symmetrical Hat Rails
- Identification Tags
- Retainer Clips
- Screw Terminal Sockets
- Surge Suppressors
- Timing Modules

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229643/229699/Product-Selection.html

10.1.4 Miniature Square Base Relay: 700-HF

Bulletin 700-HF Miniature Square Base Relays are ideal for automotive applications.

http://ab.rockwellautomation.com/Relays-and-Timers/Miniature-Square-Base-Relays

Features

- Blade-style terminals
- 2-pole, 3-pole, 4-pole
- 10 A contact rating
- DPDT, 3PDT, 4PDT
- Plug-in quick connect solder terminals
- Optional lighted status indicator, push-to-test operator

Products

- 700-HF Miniature Square Base Relays

Certifications

- UL, CSA, CE

Accessories

We offer a variety of accessories for your 700-HF Miniature Square Base Relays, including:

- DIN (#3) Symmetrical Hat Rails
- Identification Tags
- Retainer Clips
- Screw Terminal Sockets

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229643/229689/Product-Selection.html

10.1.5 Solid State Square Base Relay: 700-HB

Bulletin 700-HB Square Base Relays are designed for HVAC, elevator, and automotive industry applications. Two types of sockets are available; the IEC closed terminal version and the NEMA open terminal version.

http://ab.rockwellautomation.com/Relays-and-Timers/Square-Base-Relays

Features

- Blade-style terminals
- DPDT or 3PDT
- 15 A, B300 contact rating
- Standard ON/OFF flag indicator
- Optional lighted status indicator, push-to-test and manual override

Products

- 700-HB Square Base Relays

Certifications

- cULus, CE, ABS, IMQ, RINA

Accessories

We offer a range of accessories that complement your 700-HB Square Base Relays, including:

- DIN (#3) Symmetrical Hat Rails
- Identification Tags
- Retainer Clips

- Screw Terminal Sockets
- Surge Suppressors
- Timing Modules

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229643/229693/Product-Selection.html

10.1.6 Ice-Cube Solid-State Relays: 700-SC

Bulletin 700-SC Ice Cube Solid-state Relays are miniature, socketed relays rated to 3 A load output current.

http://ab.rockwellautomation.com/Relays-and-Timers/Ice-Cube-Solid-State-Relays

Features

- 3 A (resistive) max. continuous load output current
- 264V AC, 48V DC or 125V DC max. load voltage options
- 5…24V DC or 110/220V AC control input voltage options
- Optional lighted status indicator for input/logic On/Off monitoring
- 700-HN103, 700-HN104, or 700-HN128 socket compatible
- 700-AT1 or 700-AT2 timer module compatible

Products

- 700-SC Ice Cube Solid-State Relays

Certifications

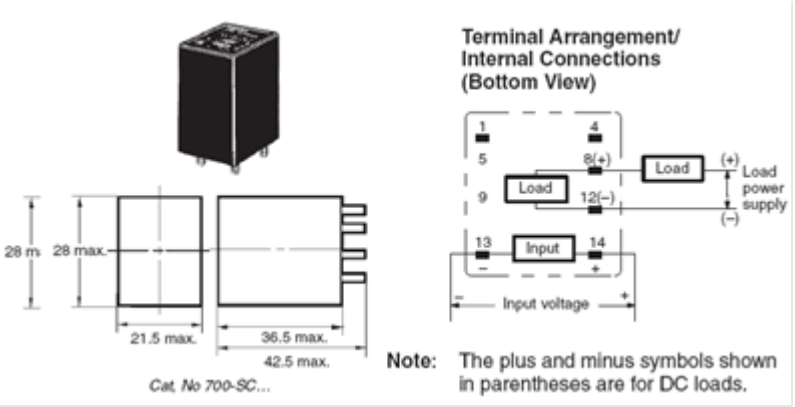
- cURus Recognized, CE Marked, VDE Certified

Accessories

We offer a variety of accessories for your 700-SC Ice Cube Relays, including:

- Identification tags
- Retainer clip
- Screw terminal sockets
- Timing module

http://www.ab.com/en/epub/catalogs/12768/229240/229266/229641/229681/Product-Selection.html



Protective Component: When controlling AC inductive loads, connect an inrush/surge absorbing device (varistor) across the SSR load terminals. If the SSR has built-in surge suppression (Bulletins 700-SE and 700-SH) and additional surge suppression is required, connect the varistor across the terminals of the load device . Select a varistor that meets the conditions of the load voltage outlined in the table below. Note: For additional details applying solid-state relays, refer to pub. Number 700-AT001A-EN-E, "Solid-State Relay Application Guide. "Document available at:
http://literature.rockwellautomation.com/idc/groups/public/documents/webassets/browse_category.hcst

10.2 Contactors

10.2.1 General Contactors: 100-C, 104-C, 100-D, 104-D, 100-G

We offer a full line of versatile IEC contactors. The Bulletin 100-C offers space-saving design in a standard contactor, and the Bulletin 100-D has flexibility with an integrated PLC interface. Bulletin 100-G contactor family provides an essential expansion to the Bulletin 100 contactor range through 1200 A (AC3) and 1350 A (AC1).

http://ab.rockwellautomation.com/Motor-Control/IEC-Contactors/IEC-Standard-Contactors

Features

- Meets IEC, UL, and CSA standards requirements
- Common accessories for all contactor sizes
- Reversible coil terminations (line or load side)
- IP2X finger protection
- RoHs compliant
- Built-in surge suppression

Products

100-C/104-C IEC Contactors

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229461/229481/tab3.html

- 4...55 kW
- 5...75 Hp (9...97 A)
- Front and side mounting of auxiliary contacts
- Electronic and pneumatic timing modules
- Space-saving coil-mounted control modules
- Reversible coil terminations (line or load side)

100-D/104-D IEC Contactors

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229461/494416/tab3.html

- 63...500 kW @ 400V
- 75...600 Hp @ 460V
- 100...700 Hp @ 575V
- Integrated PLC interface
- Low power pick-up & hold-in

100-G IEC Contactors

http://www.ab.com/en/epub/catalogs/12768/229240/229254/229461/366304/tab3.html

- 315...710 kW, 400V
- 350...900 Hp, 460/575V
- Horizontal and vertical interlocking
- Mechanical latching

Certifications

- CE marked, cULus Listed, SUVA Certified

Accessories

We offer a variety of accessories for your IEC Standard Contactors.

Bulletin 100-C/104-C IEC Contactors

- Assembly components

- Auxiliary contacts
- Control modules
- Marking systems
- Terminal kits

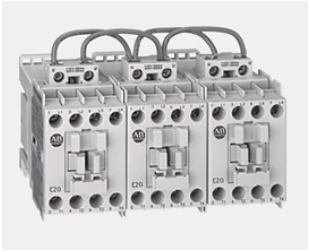
Bulletin 100-D IEC Contactors

- Auxiliary contacts
- Connecting components
- Interlocks
- Marking systems
- Supressor modules

Bulletin 100-G IEC Contactors

- Contact blocks
- Mechanical latch
- Switching poles

10.2.2 Lighting Contactor: 100L



Bulletin 100L Lighting Contactors control a variety of lighting loads. Use them for all popular lighting loads and other non-motor applications including tungsten filament lighting loads, electric discharge (fluorescent) loads, electric furnaces, and electric water heaters. In addition, these contactors meet the requirements of both CSA and UL.

http://ab.rockwellautomation.com/Lighting-Control/Multi-Pole-Lighting-Contactors/Bulletin-100L

Features

- Electrically held
- 20 A rating
- 4-, 8-, and 12-pole configurations
- Open or enclosed

Products

- 100L Multi-pole Lighting Contactors, IEC

Certifications

- cULus Listed, CE Marked

http://www.ab.com/en/epub/catalogs/12768/229240/6890817/6890955/229483/tab3.html

100L- C20abc	Lighting Contactors a = N (Open), A (IP42 Type 1), F (IP66 Type 3/4/12) b = J (24V), D (120V), H (208V), L (220V), A (240V), B (480V), C (600V) c = Number of poles (4, 8 or 12)

10.3 Mounting System 141A

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

The Bulletin 141A Mounting System provides several different mounting solutions

for IEC loadfeeders. Factory-assembled Bulletin 103 Non-Reversing and Bulletin 107 Reversing starters are available from Allen-Bradley for these mounting solutions. Also provided with the 141A Mounting System are preconfigured Circuit Breaker Modules utilizing the new Bulletin 140U Molded Case Circuit Breakers for feeding and protecting a Busbar system. 141 MCS mounting systems meet UL508A for feeder circuit spacings.

141A Components					Max Short Circuit Protection Device										
Busbar			Supports		140U MCCB	100A (G)	125A (H)	—	250A (J)	400A (K)	600A (L)	800A (M)	1200A (N)	SCCR (kA)	
Cat. No.	Dim (mm)	Amp (UL)	Cat. No.	Max Spacing	[1] UL Fuse	30, 60, 100A	—	200A	—	400A	600A	800A	1200A	480V	600V
141A-B125*	12 x 5	93	141A-TU3	800mm	CB									65	25
					Fuse									100	100
141A-B1210*	12 x 10	186	141A-TU3	800mm	CB									65	25
					Fuse									100	100
141A-B205*	20 x 5	155	141A-TU3	800mm	CB									65	35
					Fuse						500A			100	100
141A-B2010*	20 x 10	310	141A-TU3	800mm	CB									65	35
					Fuse						500A			100	100
141A-B305*	30 x 5	233	141A-TU3	800mm	CB									65	35
					Fuse						500A			100	100
141A-B3010*	30 x 10	465	141A-TU3	800mm	CB									50	25
					Fuse									100	100
141A-BT11*	TT	1,116	141A-T13	800mm	CB									65	35
					Fuse									100	100

11 Disconnects

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

11.1 IEC Rotary Disconnect Switches – 194R

http://ab.rockwellautomation.com/Motor-Control/Disconnect-Switches/IEC-Rotary-Disconnect-Switches

- 30 and 60 amp sizes: Internal handle with interlock mechanism with integrated back-plate which aligns with 194R disconnect switch mounting holes for quick and easy drop-in installation.
- NFPA 79 internal test mode handle:
- Interlock mechanism also has lock-out capability to padlock disconnect in off-condition
- All use standard 194R handles and shafts for standard operation
- NFPA 79 2002 compliant providing a means to operate the switch in an open enclosure (without the use of accessory tools or devices, i.e. wrench or vicegrips) and providing an interlocking means to prevent closing the switch unless an interlock is operated by deliberate action.

Features

- Pre-assembled options
- Robust handle design made from metal, not plastic

- On-hand operation
- Improved form and fit with a more comfortable grip
- Various ranges and sizes

Products

194R Fused Disconnect Switches

- 20...1250 A IEC
- 20…800 A UL
- Touch-safe design
- OSHA padlocking
- Front or side external operation
- Double-break switching for full fuse line and load side isolation when switch is OFF
- Uses Bulletin 800F auxilliary contact blocks to help you reduce inventory

http://www.ab.com/en/epub/catalogs/12768/229240/229254/3170947/3224914/tab3.html

194R Non-fused Disconnect Switches

- 20...1250 A IEC
- 20…800 A UL
- High performance
- Compact design
- Universal IEC/UL switch body
- Severe utilization categories (AC-22 and AC-23)
- High resistance to humidity

194R-FC Cable-operated Handle

- 30 A size
- Fused switch version certifications: UL Class J, UL Class CC
- Uses Bulletin 1494F handles: IP66 (Type 3R, 3, 12, 4, 4X)
- Pre-assembled cable-operated disconnect with interlock
- Cable options range from 3...10 feet
- Compliant with NFPA 2002

http://www.ab.com/en/epub/catalogs/12768/229240/229254/3170947/1263912/tab3.html

194R-S Side-mounted Kit

- 30...60 A sizes
- Fused switch version certifications: UL Class J, UL Class CC
- Operating handle ingress ratings: IP66 (Type 3R, 3, 12, 4, 4X)
- Pre-assembled, side-mounting bracketed disconnect interlock

http://www.ab.com/en/epub/catalogs/12768/229240/229254/3170947/1307638/tab3.html

Certifications

- UL Listed, CSA Certified, CEASTA Certified, LOVAG Certified

11.2 Variable-Depth, Flange Mounted Disconnect Switch – 1494V

http://ab.rockwellautomation.com/Motor-Control/Disconnect-Switches/NEMA-Rotary-Disconnect-Switches#/tab2

The Allen Bradley Bulletin 1494V offering includes integral disconnect switches and mechanisms for right flange installation and for left flange installation. They are designed for exceptionally long life (over 20,000 operations). New lower profile design maximizes panel space. Handle template provided with each device ensures proper operation and

adjustment of the handle connecting rod and disconnect switch. Switch, mechanism, and handle are always connected, even when the enclosure door is open.

- Available in switch ratings 30A…100A
- Non-fusible or Fusible (Class H, J, R)
- NFPA 79 Compliant
- Highly visible switch blade
- Line side shield, where power is typically present
- Protective Covers for fuses and load wires
- Color coded handle provides visual status
- Components include Disconnect Switch, Connecting Rods, Operating Handles, Trailer Fuse Block Kits, and Fuse Clip Kits.
- Accessories include Auxiliary Contacts, Protective Fuse Covers, Electrical Interlocks, Channel Support Kit, and Lug Connectors.
- Field installed Kit Options available

11.3 IEC Load Switches – 194E

http://ab.rockwellautomation.com/Motor-Control/194E-Load-Switches

The Bulletin 194 Load Switches are suitable for At-Motor Disconnect Switch

- IP66/UL Type Operating Handles
- IP2LX Finger Safe terminals
- Positive Guided Actuation
- Padlockable

11.4 NEMA enclosed Safety Disconnects - 1494G:

http://www.ab.com/en/epub/catalogs/12768/229240/229248/3178789/8266384/3178795/

The 140U-G Frame Molded Case Circuit Breakers are available in 2 and 3 pole versions, meeting the market needs for lower cost and functionality molded case circuit breakers. These thermal magnetic circuit breakers are deal for use on applications of 480V or less.

Global Approvals & Certifications

- UL489
- HACR
- CSA C22.2

Current Ranges

- Up to 100A on the 3 poles
- Up to 50A on the 2 poles

Field Accessories

- Locking attachments
- DIN rail mounting adapters
- Multi-tap terminal lugs
- Variable depth rotary operating mechanism

Factory Installed Options

- Auxiliary contacts for the 2 pole
- Auxiliary contacts and a shunt plate

12 Transformers – 1497

http://ab.rockwellautomation.com/Power-Supplies/Control-Transformers

The Allen Bradley transformer product portfolio provides:

- RoHS compliant products
- Indoor/outdoor general purpose transformers
- Small compact designs
- Single, dual and multi-tap voltages
- CE compliant products

12.1 Control Circuit Transformers – 1497

Bulletin 1497 offers single, dual, and multi-tap primary voltages. These versatile multi-tap transformers allow reduced control power from a variety of voltage sources to meet a wide array of applications.

- 63…2000 VA (50 and/or 60 Hz)
- Single phase
- Epoxy encapsulated
- EN 60-529 finger-safe protection
- IP2X finger-safe terminals
- Fuse cover, for added protection, available as an optional feature
- Includes four (4) control wires and one ground wire
- RoHS Compliant
- IEC, EN 61558
- NEMA, ICS2-1993, Port 1 Sect 9.2
- UL 506, For Class IOS Transformers
- CE
- cULus
- TÜV Rheinland

12.2 Machine Tool Transformers – 1497A

http://ab.rockwellautomation.com/Power-Supplies/Machine-Tool-Transformer

Bulletin 1497A Machine Tool Transformers (50/60 Hz) are designed to reduce supply voltages to control circuits. The complete line of transformers is available with optional factory-installed or panel-mount primary and secondary fuse block/clip.

- 50…3000 VA (50/60 Hz)
- RoHS Compliant
- Single phase
- Epoxy encapsulated
- C22.2 No. 66
- UL 506
- cULus

12.3 Control Power Transformers – 1497B

http://ab.rockwellautomation.com/Power-Supplies/Control-Power-Transformer

Bulletin 1497B Control Power Transformers are designed to reduce supply voltages to control circuits. The complete line of transformers is available with optional factory-installed or panel-mount primary and secondary fuse block.

- 50…3000 VA (60 Hz)
- RoHS compliant
- Single phase
- Epoxy encapsulated

12.4 General Purpose Transformers – 1497D

http://ab.rockwellautomation.com/Power-Supplies/General-Purpose-Transformer

Bulletin 1497D General Purpose Transformers are generally used for supplying appliance lighting, motorized machine, and power loads from electrical distribution systems.

- 0.050…25.0 kVA (60 & 50/60 Hz)
- Indoor/outdoor non-ventilated enclosure
- Single phase
- Resin encapsulated
- Exceeds requirements of the Uniform Building Code (UBC) and California Code Title 24
- Copper windings provided for all transformers rated 2 kVA and below.
- Aluminum windings provided for all transformers rated 3 kVA and above.
- NEMA Type 3R rated enclosures

13 Power Supplies

Bulletin 1606 switched mode power supplies includes four product families that meet most worldwide single and three-phase application requirements. These units are designed and manufactured to accept wide ranges of both AC and DC input voltages and are tested to meet global safety standards.

http://ab.rockwellautomation.com/Power-Supplies/Switched-Mode-Power-Supplies

- Quick mounting and connecting, innovative DIN-Rail mount, smallest in class
- UL Listed NEC Class 2; Class 1, Div. 2; Semi F47; ODVA Approved
- Low inrush current limiting
- PFC Active or Passive
- Wide range input; auto select input
- Superior overload design (continuous current, no hiccup)
- NEC Class 2 'Limited Power' options
- Selectable operating mode (single/parallel)
- Superior efficiency and temperature rating

Special Modules

- Brownout buffer, DC to DC converter, N+1 redundancy, DC UPS

http://www.ab.com/en/epub/catalogs/12768/229240/1151309/1151313/Introduction.html

13.1 Power Supply – 1606-XL

Bulletin 1606-XL Standard Switched Mode Power Supplies enhance the safety and reliability of your industrial applications. The wide power range and feature set supports most application demands. This line carries CE, cULus, and cURus approvals to meet the most stringent EMC standards.Reserve Power and Load Response

http://ab.rockwellautomation.com/Power-Supplies/Standard-Switched-Mode-Power-Supplies

Features

- Rated outputs between 60…960 W (2.5…40 A at 24V DC)
- Multiple output voltages available
- Multiple single and three-phase inputs available for global applications
- Buffer modules provide a short boost function, buffering load currents during typical main faults, switching events or load peaks
- Redundancy modules provide a means for managing dual power supplies for back-up power

Products

- 1606-XL Standard Switched Mode Power Supplies

Certifications

- CE, UL508 (cULus Listed), UL1950 (cURus), Safety standards = IEC/EN 60950, EN 50178, EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EMC standards = EN 61000-3-2 (A14), EN 50081-1

Accessories

- Batteries
- Battery brackets
- Battery assemblies with bracket
- Back-of-panel brackets

13.2 Power Supply: 1606-XLE

Bulletin 1606-XLE Essential Switched Mode Power Supplies have a simple design and offer high performing, ultra slim models with the most basic feature set. These products contain the essential features for long service life and high reliability. This line is ideal if you are interested in a cost-effective solution to power your operations.

http://ab.rockwellautomation.com/Power-Supplies/Essential-Switched-Mode-Power-Supply

Features

- Rated outputs between 80…960 W (3.3…40 A at 24V DC)
- Multiple single and three-phase inputs available for global applications
- Cost-effective solution for single-phase applications
- Redundancy modules provide a means for managing dual power supplies for back-up power

Products

- 1606-XLE Essential Switched Mode Power Supply

Certifications

- CE, UL508 (cULus Listed), UL1950 (cURus), Safety standards = IEC/EN 60950, EN 50178, EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EMC standards = EN 61000-3-2 (A14), EN 50081-1

Accessories

- Batteries
- Battery brackets
- Battery assemblies with bracket
- Back-of-panel brackets

13.3 Power Supply: 1606-XLP

Bulletin 1606-XLP Compact Switched Mode Power Supplies are an excellent choice when saving critical space is one of your main objectives. These devices are equipped with many of the same features and certifications as the XL devices and support low-power applications.

http://ab.rockwellautomation.com/Power-Supplies/Compact-Switched-Mode-Power-Supplies

Features

- Rated outputs between 15…100 W (0.6…4.2 A at 24V DC)
- Multiple output voltages available
- Multiple single and three-phase inputs available for global applications
- Smaller, cost-effective solution for low power applications
- Redundancy modules provide a means for managing dual power suppliesfor back-up power

Products

- 1606-XLP Compact Switched Mode Power Supplies

Certifications

- CE, UL508 (cULus Listed), UL1950 (cURus), Safety standards = IEC/EN 60950, EN 50178, EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EMC standards = EN 61000-3-2 (A14), EN 50081-1

Accessories

- Batteries
- Battery brackets
- Battery assemblies with bracket
- Back-of-panel brackets

13.4 Power Supply: 1606-XLS

Bulletin 1606-XLS Performance Switched Mode Power Supplies use a technology that significantly reduces unit size yet delivers a 150% power boost. Sleek and compact, these highly efficient devices have enough reserve current available to start even your most stubborn loads.

http://ab.rockwellautomation.com/Power-Supplies/Performance-Switched-Mode-Power-Supplies

The 1606-XLS design features the smallest per watt profile in the world.

Features

- Rated outputs between 80…960 W (3.3...40 A at 24V DC)
- 150% power boost feature handles start-up loads
- Multiple single and three-phase inputs available for global applications
- Small size for panel space savings
- Buffer modules provide a short boost function, buffering load currents during typical main faults, switching events or load peaks
- Redundancy modules provide a means for managing dual power suppliesfor back-up power

Products

- 1606-XLS Performance Switched Mode Power Supplies

Certifications

- CE, UL508 (cULus Listed), UL1950 (cURus), Safety standards = IEC/EN 60950, EN 50178, EMC standards = EN 55011 (Class B), EN 55022 (Class B), EN 61000-6-2, EMC standards = EN 61000-3-2 (A14), EN 50081-1

Accessories

- Batteries
- Battery brackets
- Battery assemblies with bracket
- Back-of-panel brackets

13.5 ArmorPower Supply - 1607-XT

Bulletin 1607-XT ArmorPower™ On-Machine™ Power Supplies are for applications where voltage drop occurs due to line loss, and where compact size, high efficiency, and reliability are critical. Available in 50...200 W models, these IP67-rated power supplies address a trend of eliminating traditional enclosure for on-machine and factory floor installations. These power supplies are vacuum

encapsulated to provide maximum resistance to shock, vibration, and humidity.

http://ab.rockwellautomation.com/Power-Supplies/ArmorPower-On-Machine

Features

- IP67 and NEC Class 2 ratings
- Vacuum encapsulation technology
- Quick connectors
- Smooth surface, suitable for washdown

Products

- 1607-XT ArmorPower™ On-Machine™ Power Supplies

Certifications

- UL Listed, cURus Recognized, CE Marked

Accessories

- Cordsets
- Patchcords
- Terminal chambers
- T-Ports
- Panel mount receptacles
- Input/Output devices

http://www.ab.com/en/epub/catalogs/12768/229240/1151309/9446728/Product-Selection.html

13.6 Industrial Uninterruptible Power Supply: 1609-B, 1609-D

*** Note: Replaces 1609-U Family of UPS's ***

The Bulletin 1609-B Industrial Uninterruptible Power Supplies feature the rugged industrial design and performance of the 1609-D line, without the networking and expandable battery features. They are DIN rail mountable or back-of-panel mountable and can handle temperatures up to 50 °C (122 °F) with optional battery.

http://ab.rockwellautomation.com/Power-Supplies/Uninterruptible-Power-Supplies/1609-B

Features

- DIN rail and panel/floor mount capabilities
- Hard-wired input/output connections
- Integrated remote on/off and dry contact I/O communication cables
- USB communication capabilities
- True sine wave AC output

Products

- 1609-B Industrial Uninterruptible Power Supplies

Certifications

- UL1778, CSA, EN/IEC62040-1, EMCFCC & CE (Class A), UL, cUL, FCC, CE

http://www.ab.com/en/epub/catalogs/12768/229240/1151309/3720962/11635099/Introduction.html

The Bulletin 1609-D family of Industrial Uninterruptible Power Supplies is designed for industrial applications. These power supplies include remote control features and operate inside control panels used in production environments.

http://ab.rockwellautomation.com/Power-Supplies/Uninterruptible-Power-Supplies/1609-D

Features

- Expandable battery capacity to extend run-time
- EtherNet/IP™ communication capabilities
- Includes software to allow remote monitoring and configuration
- Hard-wired input/output connections
- Integrated remote on/off and dry contact I/O communication cables
- True sine wave AC output

Products

- 1609-D Industrial Uninterruptible Power Supplies

Certifications

- UL1778, CSA, EN/IEC 62040-1, EMCFCC & CE (Class A), UL, cUL, FCC, CE

http://www.ab.com/en/epub/catalogs/12768/229240/1151309/3720962/11637777/Introduction.html

13.7 Surge and Filter Protection — Bulletin 4983

http://www.ab.com/en/epub/catalogs/12768/229240/8220195/

Noise is unwanted disturbance in your power line. Examples of noise sources are variable speed drives and computerized industrial loads. Premature aging and system interference is common to equipment without protection.

Transient and high frequency noise often go undetected until it is too late. It is not until equipment is damaged that the importance of surge and filter protection is recognized. Planning your protection is less problematic and can be less costly than reacting to a failure later. Be proactive and recognize the importance of implementing surge and filter protection as part of your industrial environment.

14 IEC Terminal Blocks and Fuse Blocks

http://www.ab.com/industrialcontrols/products/terminal_blocks_and_wiring/

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

14.1 Terminal Blocks

14.1.1 Screw Terminal Block Line – 1492-J

http://www.ab.com/industrialcontrols/products/terminal_blocks_and_wiring/iec/iec_screw.html

14.1.2 Spring-Clamp Terminal Blocks – 1492-L

http://www.ab.com/en/epub/catalogs/12768/229240/229268/3170951/2333073/

- Feed-Through Blocks and Grounding Blocks for grounding a given circuit to the DIN Rail

- Mini Blocks for applications where panel space is at a premium
- Two-Level Blocks that double circuit wiring density
- Multi-Conductor Blocks that allow splitting or joining of control circuits
- Three-Level Sensor Blocks for coordination of three-wire sensor groups
- Isolation Blocks for circuit isolation during testing and troubleshooting
- Fuse Blocks, with and without blown fuse indication
- Electrical Component Blocks that allow the insertion of fixed components into control circuits. Available components include resistors, diodes, surge suppression circuits, and shunt bars.

14.2 Fuse Blocks – 1491

http://www.ab.com/en/epub/catalogs/12768/229240/229248/2531077/

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

Bulletin 1491 Fuse Blocks have been designed for general purpose applications. The bases of these blocks, either phenolic or porcelain, are rugged in construction.

- Available from 30…600 A
- Class C, CC, H, J, and R Fuses

15 Power Terminal Blocks

http://www.ab.com/en/epub/catalogs/12768/229240/229268/471156/tab4.html

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

15.1 Power Terminal Blocks – 1492-PD

- Mini Blocks
- 3-Pole Power Distribution Blocks
- Feed-Through/Splicer Blocks with
- CE Marked
- CSA Certified (File No. LR 19766, Class 605204)
- UL Listed (File No. E40735, Guide No. XCFR2)
- Flammability Ratings: 94V-O

15.2 Enclosed Power Distribution Terminal Blocks – 1492-PDE

The 1492-PDE Enclosed Power Distribution Terminal Blocks are designed to prevent accidental contact with live connectors without the use of additional barriers or shields. These panel mount devices have a compact footprint, and are available with either aluminum or copper terminals. Captive termination screws ensure that parts never get lost and the rugged polycarbonate housing will resist physical damage. The single-pole devices are easily gangable to create multi-pole solutions.

- UL recognized, CSA certified, CE compliant
- Numerous connector configurations
- IP20 from the front
- Multi-pole assembly possible with easily gangable units
- Markers are available for easy terminal identification

- High fault SCCR up to 100 kA
- 1-pole devices with aluminum or copper connectors
- 175…510 A current range
- 110…600V AC/DC operating range

15.3 Enclosed Power Distribution Blocks – 1492-PDL

- UL1953 Listed Power Distribution Blocks
- SCCR up to 100 kA
- CE Compliant
- Three pole devices
- 600V, up to 335A

16 Connection Systems

16.1 Mini-Style - 889N updated part numbers

http://ab.rockwellautomation.com/connection-devices/mini-cordsets-and-patchcords

- For Chrysler Powertrain, 9-pin overmolded connectors, One Piece molded body design
- NEMA 4, 6P, 12, 13, IP67
- 1200 psi washdown
- Heavy-duty STOOW 16 AWG cable
- UL recognized and CSA certified

16.2 Micro-Style - 889D

http://www.ab.com/en/epub/catalogs/3784140/10676228/4129860/6264953/6395200/tab2.html

- 4-pin and 5-pin DC Micro-style
- Male or female connector types in straight or right angle versions
- Optional stainless steel or nickel plated brass coupling nuts optional
- IP67, NEMA 6P, 1200psi washdown rated
- Molded oil resistant PUR material for cables

16.3 Pico-Style - 889P

http://www.ab.com/en/epub/catalogs/3784140/10676228/4129860/6264953/6395200/tab7.html

- 3-pin configurations for Chrysler Powertrain
- Straight or right angle versions.
- Screw-on or snap-on style connectors
- Nickel-plated brass Pico coupling nuts
- IP67 rated for industrial environments
- 4-, 6-, 8-, 10-port distribution boxes
- Compact size provides solutions for space limited applications
- Available LED style connectors provide enunciation at the field device
- Multiple thru-holes on distribution boxes provide ease of mounting
- Insulation Displacement Connection field attachable connectors for virtually tool-free installation
- Patchcords, Y-cables, and splitters provide direct connection of Pico field devices to DC Micro distribution boxes or I/O
- Molded oil resistant PUR material for cables

16.4 DIN Valve Field Connectors and Cordets (new)

http://www.ab.com/connectionsystems/connectors/889din.html

889 DIN Valve Connectors

Recognizing the importance of flexibility and value in your control system, Rockwell Automation continues to introduce new connection systems components that help make your installations simpler while addressing the market's ever-changing needs. From specialized safety connection systems to a full complement of standard patchcordsand cordsets, Allen-Bradley connectivity products are rugged, cost-effective solutions for a broad range of industrial applications. New Allen-Bradley DIN Valve cordsets and field attachable connectors bring novel features and connectivity options to the On-Machine solution provided by Rockwell Automation.

Available in a variety of sizes and wiring configurations, Allen-Bradley DIN valve connection systems components simplify installation, modification and maintenance of your control system.

16.5 Distribution Boxes

http://www.ab.com/en/epub/catalogs/6005557/6005561/10508501/

General Features:

- IP67, NEMA 6P
- Insulation Displacement Connectors (IDC) terminates cables without stripping and connecting individual leads to screw terminals.
- Multiple field devices can be wired more efficiently in a consolidated package
- Quick disconnect main connectors make wiring easy.
- Troubleshooting is simplified with LED output identification

Connection Type	DC Micro		Pico		IDC
Main Connector	Cable	Terminal Chamber	Cable	DC Micro QD	Cable
Lengths / Pin Counts	5m, 10m	--	5m, 10m	8-pin	5m, 10m
No. of Ports	4, 6, 8 Single & Dual Output	4, 8 Single Output	4, 6, 8, 10, 12	4, 6	8 Single Output
LED Type	No LED, PNP, NPN	No LED, PNP	PNP	PNP	No LED, PNP

16.5.1 DC Micro Connection Type – 898D

- Yellow PET body offers good oil and chemical resistance
- 4, 6, or 8 DC micro connectors
- LED version for use with PNP
- IP67, NEMA 6P

16.5.2 Pico Connection Type – 898P

- Grey Pocan body offers good oil and chemical resistance
- Side and Top mounting holes
- PUR cable
- LED version for use with PNP

16.5.3 IDC Type – 898H

- Yellow PET body offers good oil and chemical resistance

- Insulation Displacement Connectors (IDC) terminates cables without stripping and connecting individual leads to screw terminals.
- PUR cable
- LED version for use with PNP

16.6 EtherNet/IP Media

http://ab.rockwellautomation.com/networks-and-communications/ethernet-ip-media

16.6.1 Ethernet 4-pin M12 cordset

- Over molded housing suitable for IP 67 applications
- Flex rated
- Twisted pair conductors allow for a reliable connection

16.6.2 Ethernet RJ45 cordset

- Flex rated and PVC cables for various applications
- Teal or red cable jacket
- Rugged strain relief and hitch mechanism to maintain network integrity

17 Ethernet Encoder

The 842E is an ultra-high resolution multiturn absolute encoder with EtherNet/IP interface, dual-port embedded switch and DLR. These encoders provide 18-bit singleturn resolution and 30-bit multi-turn
resolution. The EtherNet/IP encoder is targeted for high performance and reliability in harsh industrial environments. Encoder includes an embedded EtherNet/IP switch to connect additional E/IP capable product in series and/or support a Device Level Ring (DLR) for ethernet media redundancy

http://www.ab.com/en/epub/catalogs/3784140/10676228/4129858/6349953/11624044/Introduction.html

18 Power Products

http://ab.rockwellautomation.com/Motor-Control/Motor-Control-Centers

18.1 Intelligent Motor Control (Less than 600 Vac)

Intelligent Motor Control provides improved diagnostics and predictive failure information. They are also pre-tested and pre-configured systems. DeviceNet simplifies inter-wiring by replacing traditional hard-wiring DeviceNet ports in each vertical wireway.

IntelliCenter Software

- MCC monitoring in Windows environment
- Pre-configured screens display real-time information
- Complete system documentation
- Software optimized to ensure performance- Polling algorithm segregates monitoring and control so monitoring scans do not affect control scans
- Complements operator interface and product software such as DriveTools and RSEnergy

System configuration

- Node addresses downloaded into devices

- Documentation CD created with MCC specific information

System testing

- IntelliCENTER software and documentation CD loaded onto PC
- DeviceNet powered up
- Software and component communication and functionality verified

18.2 SMC Dialog Plus Smart Motor Controller: Bulletin 150

For information in regards to understanding NEC Article 409 and UL508A, supplement SB for Short Circuit Current Ratings, reference the following link:

http://www.rockwellautomation.com/products/certification/ul508a/

http://www.ab.com/en/epub/catalogs/12768/229240/229262/3073021/229589/

The SMC Dialog Plus™ controller provides microprocessor controlled starting for standard three-phase squirrel-cage induction motors. Four standard modes of operation are available within a single controller:

Features

- Built-in electronic motor overload protection
- Metering
- SCANport™ communication
- Keypad programming
- Three programmable auxiliary contacts
- Status indicator display

Products

- 150 SMC™ Dialog Plus Smart Motor Controller
- 150 SMC Dialog Plus Non-Combination Smart Motor Controller
- 152/3 SMC Dialog Plus Combination Smart Motor Controller

18.3 SMC-Flex (Less than 600 Vac)

http://ab.rockwellautomation.com/Motor-Control/Soft-Starters/SMC-Flex

The SMC Flex controller provides microprocessor controlled starting for standard 3-phase squirrel-cage induction or Wye-Delta (6-lead) motors. Seven standard modes of operation are available within a single controller.

- 1…1250 A Range
- Seven Standard Start Modes
- Options Include Pump Control and Braking Control
- Built in SCR Bypass/Run Contactor
- Built in Electronic Motor Overload Protection
- CT on each Phase
- Metering
- LCD Display
- Keypad Programming
- Four Programmable Auxiliary Contacts

18.4 SMC-3 Smart Motor Controller

http://ab.rockwellautomation.com/Motor-Control/Soft-Starters/SMC-3

The Allen-Bradley SMC-3 softstarters from Rockwell Automation provide integrated features and technology previously unavailable in a compact 45 mm housing. The flexibility and capabilities of the SMC-3 make it

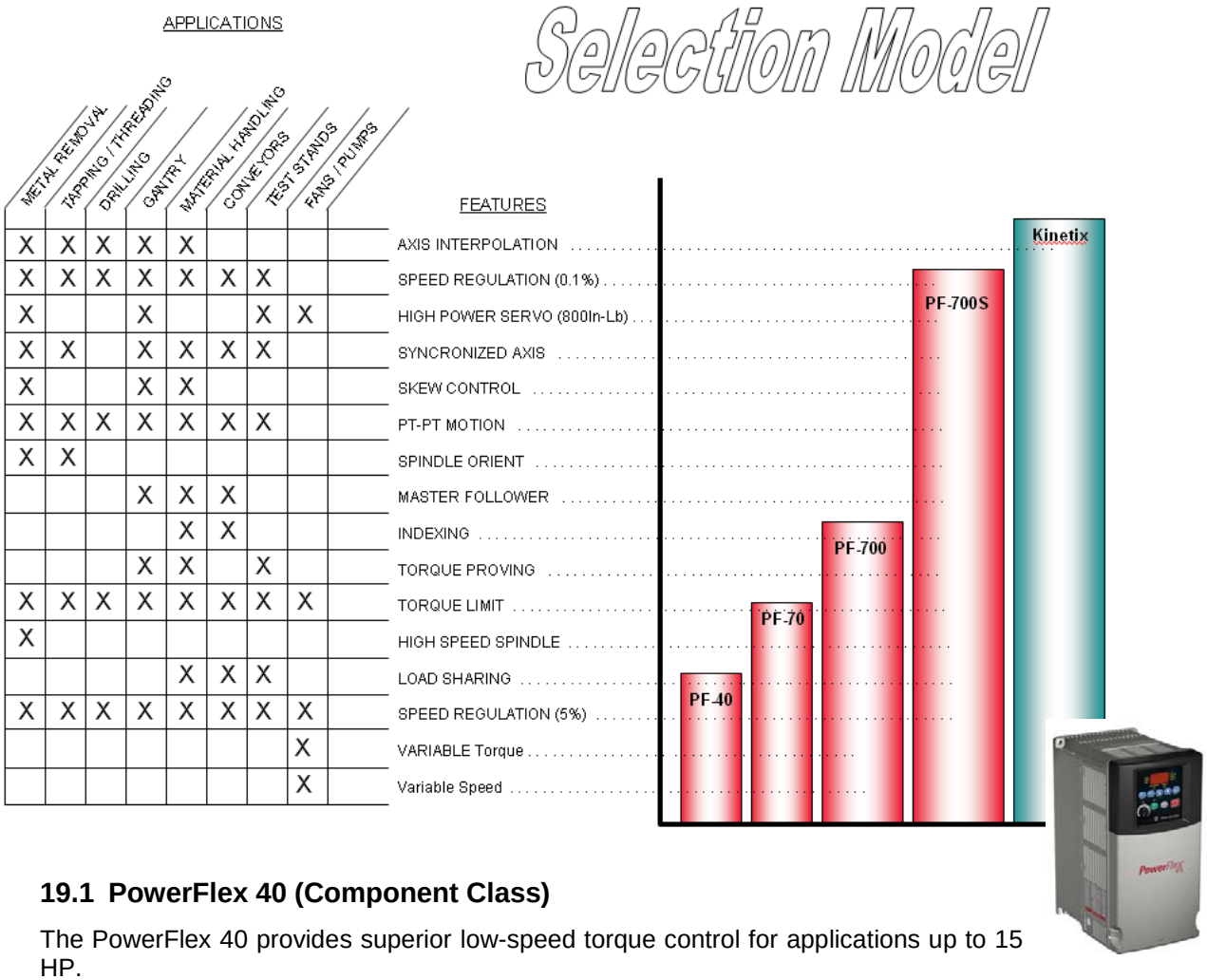
ideal for almost any application, and with the available accessories, the functionality and application range is extended even further. The SMC-3 takes soft starting to a new dimension by providing increased intelligence in a compact footprint. As standard, this true three-phase controlling device includes electronic overload protection with adjustable trip class, increased motor and system diagnostics, configurable auxiliary contacts, and multiple start and stop modes.

- ControlNet
- EtherNet
- ProfiBus

19 Standard Drives

http://ab.rockwellautomation.com/Drives/Low-Voltage-AC-Drives

The Allen-Bradley® PowerFlex family of drives is geared for motor control applications ranging from low to medium voltage. PowerFlex drives range from 0.2 kW (0.25 hp) to 6,770 kW (9,000 hp). Our Component Class drives offer cost-effective motor control, geared for machine-level and stand-alone applications. Our Architecture Class drives provide superior application flexibility and control system integration for a broad range of power offerings. All PowerFlex drives offer commonality in networks, operator interface and programming – factors that significantly contribute to ease-of-use and faster application start-up.



19.1 PowerFlex 40 (Component Class)

The PowerFlex 40 provides superior low-speed torque control for applications up to 15 HP.

DOCUMENTATION:

- PowerFlex 40 User Manual: 22B-UM001…….

- PowerFlex 40 Quick Start: 22B-QS001…….
- Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives DRIVES-IN001…….

APPLICATIONS:

- Pumps & Fans
- Material Handling – Conveyors, Palletizers,
- HVAC – Heating, Ventilation, Air Conditioning

FEATURES:

- Flange mount (Heatsink) drives are available to reduce overall enclosure size.
- Drive Protection includes Motor Overload, Output Short Circuit, Output Ground Fault, Over & Under Voltage.
- Internal Chopper (7th Transistor) provides the ability to apply an optional Dynamic Brake Resistor.
- Highly configurable I/O including a 0-10V or 4-20mA analog output.
- Sensorless Vector Control with autotuning provides optimum motor performance for applications requiring high torque at low speeds.
- Basic logic, timer and counter functions can save installation cost and panel space by eliminating stand alone timing relays and counters or discrete wiring to a pico or microcontroller.
- PID, Flying start, S-curve and StepLogic™ functions provide increased application flexibility.
- Ease of programming with Integral keypad, remote mounted HIM's or DriveExplorer™ or DriveTools SP™ configuration software. Ten most commonly programmed parameters grouped together for fast and easy startup.
- Integral RS485 communications provides low cost network solutions. Add on DeviceNet™, EtherNet/IP™ or Profibus communications provides increased communication flexibility.
- DIN rail mounting, Zero Stacking™ & large power and control terminals saves panel space and installation time.
- Integral filter for single phase230 volt drives & piggy back mounted external filters for three phase ratings reduce the amount of space required when complying with EMC requirements.

RATINGS:

- 100-115V – Single Phase (0.5 – 1.5Hp)
- 200-600V – Three Phase (0.5 – 15Hp)
- IP-20 (Open), IP-30 (Nema 1), IP-56 (Nema 4X / 12) with Heatsink.
- Standards – UL, CE, CSA, C-Tick
- Overload Capacity – (Normal Duty) -110% for 60 seconds, 150% for 3 seconds.
- Overload Capacity – (Heavy Duty) - 150% for 60 seconds, 200% for 3 seconds.
- Output Frequency Range - 0 - 400Hz.
- Control Voltage – 24V DC sinking or sourcing. 3-Dedicated Inputs and 4 Programmable.
- 1 – Analog Output (4-20ma or 0-10V)
- 3 – Digital Outputs (1-Form C relay, 2- Opto Coupled).
- Speed Regulation – 2% of base speed across 40:1 speed range using "Sensorless Mode" with No Encoder.

19.2 PowerFlex 70 (Architecture Class)

The PowerFlex 70 can be programmed for Volts per Hertz, Sensorless Vector or Vector Control with Force Technology to cover a wide range of applications from fans to extruders up to 50 HP. Optional internal communication modules provide fast and efficient control and/or data exchange with a host of controllers over popular interfaces. These interfaces include: Ethernet IP,

DeviceNet, ControlNet, Remote IO, RS-485 DF-1, RS4850HVAC, ProfiBus, LonWorks, InterBus, Canopen, Compac I/O.

DOCUMENTATION:

- PowerFlex 70 User Manual: 20A-UM001…….
- PowerFlex 70 Quick Start: 20A-QS001…….
- PowerFlex 70/700 Reference Manual: PFLEX-RM001…….
- Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives: DRIVES-IN001…….

FEATURES:

- Encoder Feedback Option – (both 5V & 12V) for closed loop vector performance.
- Droop Control – for load sharing applications
- Dynamic User Sets – provides a way to switch between user sets with a digital input or over the network command.
- Sleep / Wake Control – provides start / stop control from an analog input.
- Input Phase Loss Detection and Ground Fault Warning
- Flux Braking and Half Voltage Ride Through
- Level Sensitive Mode – applications requiring drive to run purely on "level" of the run signal, without a fresh edge.
- Digital Input Data Logic
- Security Aware – Allows the user to turn off access from individual ports.
- Network Controlled Outputs
- Dedicated Drive Enable – activated by removal of a jumper, which dedicates digital input 6 as the hardware enable.
- Flange mount (Heatsink) drives are available to reduce overall enclosure size.
- Drive Protection: Motor Overload, Output Short Circuit, Output Ground Fault, Over & Under Voltage.
- Internal Chopper (7th Transistor) provides the ability to apply an optional Dynamic Brake Resistor.

RATINGS:

- 200-240V 3Ph (0.5 – 25Hp); 380-480V 3Ph (0.5 – 50Hp); 500-600V 3Ph (0.3 – 20Hp)
- Open type/IP-20/UL type 1, IP-30 (Nema 1), IP-66 (Nema 4X / 12)
- Standards – UL, CE, CSA, C-Tick
- Overload Capacity – (Normal Duty) -110% for 60 seconds, 150% for 3 seconds.
- Overload Capacity – (Heavy Duty) - 150% for 60 seconds, 200% for 3 seconds.
- Output Frequency Range - 0 - 500Hz.
- Digital Inputs (6) – 24V DC (sinking / sourcing) or 115V AC (Option Module). - 6 Programmable inputs.
- Digital Outputs (2) - Form C type.
- 1 – Analog Output (4-20ma or 0-10V)
- Speed Regulation – 0.001% of base speed across 120:1 speed range using "Vector Control Mode"

19.3 PowerFlex® 70 AC Drive DriveGuard™ Safety Solutions

The safe-off drive is designed to safely remove power from the gate firing circuits of the drive's output power devices (IGBTs). This prevents them from switching in the pattern necessary to generate AC power to the motor. This drive can be used in combination with other safety devices to meet the stop and protection against restart requirements of EN 954-1, category 3.

This safe-off option meets the following safety standards:

- EN 60204-1 Safety of machinery – Electrical equipment of machines – Part 1: General Requirements.
- EN 954-1:1997; Category 3 – Safety-related parts of control systems.

DOCUMENTATION:

- PowerFlex 70 “DriveGuard” Safe-Off User Manual User Manual: PFLEX-UM001A-EN-P

19.4 PowerFlex 700 (Architecture Class)

The PowerFlex 700 can be programmed for Volts per Hertz, Sensorless Vector or Vector Control with Force Technology to meet all application needs up to 200 HP. Excellent torque production and tight torque regulation for the most demanding applications like extruders and web processes. Additional features include “TorqueProve” for vertical lift applications, Positioning and adjustable voltage control. Optional internal communication modules provide fast and efficient control and/or data exchange with a host of controllers over popular interfaces. These interfaces include: Ethernet IP, DeviceNet, ControlNet, Remote IO, RS-485 DF-1, RS4850HVAC, Profibus, LonWorks, InterBus, Canopen, Compac I/O.

DOCUMENTATION:

- PowerFlex 700 User Manual: 20B-UM001…….
- PowerFlex 70 Quick Start: 20B-QS001…….
- PowerFlex 70/700 Reference Manual: PFLEX-RM001…….
- Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives: DRIVES-IN001…….

APPLICATIONS:

- High Speed Spindles, Spindles
- Material Handling – Skillets, AGV’s,
- Conveyors – Chain Conveyors, Power Roller Beds
- Turntables, Cross Transfers,
- Load Sharing applications
- Extruders
- Linear Motors (Adjustable Voltage Control)
- Lifts & Hoists – (Torque Proving)
- Web Handling / Tension Control
- Fans & Pumps

FEATURES:

- Precise Speed Control (open or closed loop)
- Encoder Feedback / pulse input Option
- Position Indexing / Speed Profiling
- DC Bus regulation
- Slip Compensation or Droop Control
- Advanced Flying Start (instantaneous)
- PTC Input
- Dedicated Enable Input (Selectable)
- Network Controlled Outputs
- Inertia Ride-Through
- Flux Braking
- 3 Digital and 2 Analog Outputs
- Process PI loop
- 6 High Speed Digital Inputs and 2 High Speed Analog Inputs
- Dynamic User Sets: a way to switch between user sets with a digital input or over a network command.
- Sleep / Wake Control – provides start / stop control from an analog input.
- Input Phase Loss Detection and Ground Fault Warning
- Security Aware – Allows the user to turn off access from individual ports.
- Torque Proving (includes Flux Up and Last Torque measurement)
- Vector Control with Force Technology for speed control or torque control, open loop or closed loop.
- Drive Protection: Motor Overload, Output Short Circuit, Output Ground Fault, Over & Under Voltage.
- Internal Chopper (7th Transistor) provides the ability to apply an optional Dynamic Brake Resistor.

RATINGS:

- 200-240V – 3Ph (0.5 – 100Hp); 380-480V – 3Ph (0.5 – 200Hp); 500-690V – 3Ph (1 – 150Hp)
- Open type/IP-20/UL type 1, IP-54/UL type 12
- Standards – UL, CE, CSA, C-Tick

- Overload Capacity – (Normal Duty) -110% for 60 seconds, 150% for 3 seconds.
- Overload Capacity – (Heavy Duty) - 150% for 60 seconds, 200% for 3 seconds.
- Output Frequency Range - 0 - 400Hz.
- Operating speed range = 1000:1
- Digital Inputs (6) - 24V DC (sinking / sourcing) or 115V AC. - 6 Programmable inputs.
- Digital Outputs (3)
- 2 – Analog Input – Bipolar, differential (4-20ma and 0-10V)
- 2 – Analog Output – Bipolar, differential (4-20ma and 0-10V)
- Speed Regulation: 0.001% base speed across 120:1 speed range w/ Vector Control Mode"(1000:1 Operate Range)
- Torque Regulation - +/- 5% , 2500 rad/sec bandwidth (with feedback)

19.5 PowerFlex 700S (Architecture Class)

The PowerFlex 700S AC drive, a version of the PowerFlex 700 power platform, offers optimized integration for the most demanding stand-alone and coordinated drive control system applications up to 1250 Hp. Selectable high-performance motor control algorithms utilizing FORCE Technology allows you to select Vector, Sensorless vector, V/Hz and Permanent Magnet Motor Control. The PowerFlex 700S with DriveLogix option combines the powerful performance and flexible control of PowerFlex AC drives with high-performance Logix engine to produce a highly functional, cost effective drive control solution. Optional internal communication modules provide fast and efficient control and/or data exchange with a host of controllers over popular interfaces. These interfaces include: Ethernet IP, DeviceNet, ControlNet, Remote IO, RS-485 DF-1, RS4850HVAC, Profibus, LonWorks, InterBus, Canopen, Compac I/O.

DOCUMENTATION:

- PowerFlex 700S User Manual: 20D-UM006…….
- PowerFlex 700S DriveGuard "Safe-Off" User Manual: 20D-UM007A…….
- PowerFlex 700S Reference Manual: PFLEX-RM003A……..
- Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives: DRIVES-IN001…….

APPLICATIONS:

- Single Axis Positioning Applications
- Leader / Follower Synchronized Positioning
- Spindle Orient
- Storage Retrieval Systems
- Move to Hard Stop Applications
- Test Stands
- High Speed Spindles, Spindles
- Material Handling – Skillets, AGV's,
- Conveyors – Chain Conveyors, Power Roller Beds (PRB)
- Turntables, Cross Transfers,
- Load Sharing
- Torque Proving (Vertical Lifts & Hoists)
- Fans & Pumps

FEATURES:

- Vector Control - with Force Technology for speed control or torque control, open loop or closed loop.
- Selectable high-performance motor control algorithms utilizing FORCE Technology allows you to select Vector, Sensorless vector, V/Hz and Permanent Magnet Motor Control.
- DriveLogix 5730 Option - Embedded LogixTM Controller.
  - Supports 8 separate tasks with 32 programs per task, 1 continuous task / 7 periodic tasks
  - Ladder Diagram / Function Block / Structured Text / Sequential Function Chart
  - 1.5 Mbytes of user program memory
  - Compac I/O
- Standard quadrature encoder input with optional feedback boards for Stegmann & Heidenhein high resolution feedback, Resolver, Stahltronics, Temposonics, SSI linear feedback type).
- Automatic feedback loss switch over to encoderless.
- SynchLink, a high performance, high speed, synchronization and drive-to-drive data link.

  - Processor synchronization for multiple devices
  - 1 to 50 □Sec transfer rates with multiple data configurations.
- Complete motor autotune and inertia measurement for both induction and permanent magnet motor control
- Dynamic User Sets – provides a way to quickly switch between entire user sets with a digital input or over the network command.
- Sleep / Wake Control – provides start / stop control from an analog input.
- Input Phase Loss Detection
- Ground Fault Warning – for early detection of system ground faults.
- Flux Braking
- Security Aware – Allows the user to turn off access from individual ports.
- Network Controlled Outputs
- Dedicated Drive Enable – activated by removal of a jumper, which dedicates digital input 6 as the hardware enable.
- Safe-Off Option – provides certified EN954-1 Category 3 functionality (Safe-Off and protection against restart).
- Flange mount (Heatsink) drives are available to reduce overall enclosure size.
- Drive Protection includes Motor Overload, Output Short Circuit, Output Ground Fault, Over & Under Voltage.
- Internal Chopper (7th Transistor) provides the ability to apply an optional Dynamic Brake Resistor.

RATINGS:

- 200-240V – 3Ph (1 – 100Hp): 380-480V – 3Ph (1 – 1250Hp); 500-600V – 3Ph (1 – 600Hp)
- 690V …… - 3Ph (45Kw – 560Kw)
- Open type / IP-20 / NEMA Type 1, IP-54 / NEMA Type 12 (Flange Mount), IP56 / NEMA Type 4X
- Standards – UL, CE, CSA, C-Tick
- Overload Capacity – (Normal Duty) -110% for 60 seconds, 150% for 3 seconds.
- Overload Capacity – (Heavy Duty) -150% for 60 seconds, 200% for 3 seconds.
- Power Ride Thru: - 15milliseconds @ full load.
- Output Frequency Range - 0 - 400Hz.
- Operating speed range = 1000:1
- Digital Inputs (6-Total) – DI-1, DI-2, DI-3 = 24V DC (sinking / sourcing)…. DI-4, DI5, DI-6 = 24V DC (sinking / sourcing) or 115V AC. - All 6 Inputs are Programmable.
- Digital Outputs (2) – Form C type
- 2 – Analog Input – Bipolar, differential (4-20ma and 0-10V)
- 2 – Analog Output – Bipolar, differential (4-20ma and 0-10V)
- Speed Regulation – (Without Feedback) = 0.1% of base speed across 120:1 speed range using “Vector Control Mode” (120:1 Operating Range)
- Speed Regulation – (With Feedback) = 0.001% of base speed across 120:1 speed range using “Vector Control Mode” (1000:1 Operating Range)
- Torque Regulation - +/- 5% , 600 rad/sec bandwidth (without feedback)
- Torque Regulation - +/- 5% , 2500 rad/sec bandwidth (with feedback)

19.6 PowerFlex® 750 Series (753 & 755) AC Drives (Architecture Class)

The PowerFlex 750-Series of AC drives was designed with your needs in mind. Your need for flexibility, productivity and ease of use has been considered in every detail of these drives. The result is a family of AC drives that provides an exceptional user experience, from initial programming through operation.

This robust family of AC drives offers high performance for a wide variety of industrial applications. The PowerFlex 753 provides general purpose control for applications ranging up to 350 Hp/250 kW while the PowerFlex 755 provides maximum flexibility and performance up to 2000 Hp/1500 kW.

Consider these key features of the PowerFlex 750-Series drives and how they can help you maximize your productivity:

Simplified Integration with Logix – The PowerFlex 753 and 755 over seamless integration into the Logix environment for simplified and enhanced configuration, programming, commissioning, diagnostics and maintenance. Using either Add-on Profiles or embedded instructions*, you'll be able to reduce engineering time – and related costs – while improving the configuration, control and collection of data.

Communications – The PowerFlex 750-Series supports a comprehensive range of network protocols to ease integration into your architecture. The PowerFlex 755 features an embedded EtherNet/IP™ port, allowing you to easily manage drive data over EtherNet/IP networks. In addition, a dual-port EtherNet/IP option module for the PowerFlex 750-Series provides flexible and cost-effective ways to apply EtherNet/IP, including Device Level Ring functionality.

Safe Torque-off and Safe Speed Monitor – Help protect personnel and equipment while reducing machine downtime with safety solutions up to and including PLe/SIL, Cat 3 and Cat 4. These safety options provide a choice for safety levels depending on your application requirements.

DeviceLogix™ – Controls outputs and manages status information locally within the drive, allowing you to operate the drive independently or complementary to supervisory control.

Configure for Your Application – Each drive has a slot-based hardware architecture that reduces unnecessary add-ons and gives you the flexibility to select option cards to suit your application and expand your drive for future needs. Supported hardware control options are common for the series to help reduce your inventory and spare parts requirements.

Predictive Diagnostics – Prevent unplanned downtime with predictive diagnostics and built-in protection features to help guard your investment. These settings allow the PowerFlex 750-Series to keep track of information that affects the life of the drive components. PowerFlex 755 drives 250 k W/350 Hp and larger have additional diagnostic features including built-in protection devices.

Application matched Packaging – Gain additional flexibility with packaging options that address a range of application and environmental protection requirements.

Feedback – Options include Universal, Encoder and Dual Encoder feedback options. The Universal Feedback option includes multiple feedback interfaces to support a wide range of applications. Interfaces supported are Incremental, EnDat and Hiperface for Stegmann and Heidenhain high resolution feedback, SSI and BiSS for rotary and linear applications. The drives also provide:

- Automatic feedback loss switchover.
- High-definition LCD display allows for six lines of text for more meaningful explanations of parameters and events.
- Standard I/O on the PowerFlex 753 provides a cost-effective solution.
- Real-time clock provides time-stamped events vs. run-time data.
- Additional DPI for expanded programming capability.
- Increase safety performance levels with the Safe Speed Monitor option card which includes an embedded safety relay.
- Packaging options to meet application requirements.
- DeviceLogix embedded control technology provides function block programming for stand-alone control of basic applications.
- Easily configure, control and collect drive data with standard embedded Ethernet port on the PowerFlex 755.
- Slot-based mechanical architecture to support additional options for I/O, feedback, safety, communications and auxiliary power supply.
- Optional Auxiliary Power Supply maintains control and communications in event that main power is not present.
- Easily assessable heat sink and internal fans.
- **"e-Tools"** Simplify and Enhance Use of PowerFlex 750-Series Drives

- **Add-on Profiles**

  For simplified AC drive start-up and reduced development time, we've integrated Allen-Bradley® PowerFlex drive configuration with Studio 5000™ Logix Designer software (formerly RSLogix™ 5000). This single-software approach simplifies parameter and tag programming while still allowing stand-alone drive software tool use on the factory floor.

- **Embedded Instructions**

  The PowerFlex 755 AC drive can be configured with drive instructions embedded in Allen-Bradley ControlLogix and CompactLogix Programmable Automation Controllers (PAC). These are the same configuration parameters and programming instructions used by Allen-Bradley Kinetix® servo drives, providing a common, enhanced user experience.

- **DriveTools™ SP Software Suite**

  A powerful PC-based software suite for programming, configuring, and troubleshooting.

  • DriveExecutive™– for online/offline configuration and management of drives and drive peripherals

  • DriveObserver™ – for real-time trending of drive information

- **Connected Components Workbench™**

  Programming and configuration software supports all PowerFlex drives, Micro800™ controllers and PanelView™ component graphic terminals. This software leverages proven Rockwell Automation and Microsoft® Visual Studio® technologies for fast and easy controller programming, drive configuration and integration with the HMI editor.

The Right Packaging for Your Application

Because application conditions and environments vary, PowerFlex 750-Series drives are available with a choice of packaging options. From highly flexible IP00 open styles to MCC-style cabinets and other features that help provide additional protection, there's a PowerFlex 750-Series drive with the right packaging to help you meet productivity goals.

PowerFlex 755 Floor Mount Drives with IP00, NEMA/UL Open Type Ratings

- The PowerFlex 755 IP00, NEMA/UL Open Type drives are designed to provide packaging flexibility, including the option for either vertical or horizontal mounting orientations. This option is available in PowerFlex 755 floor mount drives with ratings up to 1500 kW/2000 Hp.

PowerFlex 750-Series Drives with IP54/UL Type 12 Ratings

- For applications requiring additional protection from harsh environments, PowerFlex 753 and 755 drives are available with IP54/UL Type 12 enclosures. These enclosures help protect the drive from dust and splashing water and are appropriate for moderately harsh indoor environments.

19.6.1 PowerFlex® 755 AC Drive

http://ab.rockwellautomation.com/Drives/PowerFlex-755

PowerFlex 755 is ideal for applications requiring positioning, speed or torque control up to 1500 kW/2000 Hp. The PowerFlex 755 is easily integrated with the embedded Ethernet port and has five option slots to support additional options for feedback, I/O, safety, communications, and auxiliary 24V DC control power.

The PowerFlex 755 AC drive can be integrated with a ControlLogix® or CompactLogix™ Programmable Automation Controller (PAC) via drive instructions that are actually embedded in the PAC. This level of integration is specic to PowerFlex 755 drives on EtherNet/IP

The first drive to be released from the Allen-Bradley® PowerFlex 750-Series, the PowerFlex 755 AC drive provides greater functionality across your manufacturing systems from:

- .75…1400 kW 400V AC (540V DC input)
- 1...2000 Hp 480V AC (650V DC input)

The PowerFlex 755 AC drive offers more selection for control and supporting hardware options than any other drive in its class and in addition to all the options and benefits available in the PowerFlex 750-Series, the PowerFlex 755 drives 250 kW/350 Hp and larger offer added benefits for maintenance and installation flexibility.

- Control pod is common with smaller ratings providing embedded Ethernet port and 5 slots for option modules, and can be remote mounted (up to 23 m) for hassle-free access to low voltage control.
- Roll in/out design makes the drive easy to install and service by allowing complete removal from cabinet, providing generous room for wiring behind the drive. Power wiring can stay connected while unit is rolled out.
- Adjustable terminals provide flexibility for wiring preferences such as top or bottom entry.
- Integrated fusing eliminates need for separatelymounted drive short circuit protection. Status is reported from the drive to ease troubleshooting.
- Replaceable surge protector reduces downtime after incoming transient voltage events. Status is reported from the drive to ease troubleshooting.
- Integrated DC link inductor enhances protection from power system events, and reduces input harmonics.6
- Sealed cooling channel uses external air for main cooling, reducing contamination exposure for electronics.
- Modular construction allows fast and easy replacement of parts (e.g., main blower, capacitor assembly, circuit boards), minimizing production downtime.

19.6.2 PowerFlex® 753 Series AC Drive

http://ab.rockwellautomation.com/Drives/PowerFlex-753

The PowerFlex 753 is ideal for general purpose applications requiring speed or torque control up to 250 kW/350 Hp. Embedded I/O along with three option slots for safety, feedback, communications, 24V power or additional I/O make the drive a flexible, cost-effective solution operating from:

- 0.75…250 kW 400V AC (540V DC input)
- 1...350 Hp 480V AC (650V DC input)

As part of the PowerFlex 750-Series, the PowerFlex 753 has a common set of features and options to help you maximize your investment and improve your productivity.

  - DeviceLogix™ — Embedded control technology that supports the manipulation of discrete outputs and drive control functions, while using discrete inputs and drive status information onboard the drive.
  - Predictive Diagnostics — Allows the PowerFlex 750-Series to keep track of information that affects the life of its cooling fans and relay outputs. The drive can also be programmed to monitor the run time hours for machine or motor bearings.
- Option Cards — Each drive has a slot-based architecture allowing you to build the drive to suit your application. Supported hardware control options are common for both products, to help reduce your inventory and spare parts requirements.
- Safe Torque-Off and Safe Speed Monitor — These safety options provide a choice for safety levels depending on your application requirements.
- Communications — The PowerFlex 750-Series supports a variety of network protocols. Ethernet can easily be added to the PowerFlex 753 with a communication module.
- I/O — The PowerFlex 750-Series offers option cards for additional analog and discrete I/O. The PowerFlex 753 comes with built-in I/O that can also be easily expanded with option cards.
- Packaging — Factory and field installable enclosure options are available to meet most environmental requirements: Open Type and Flange Mount options to support Cabinet Mount requirements, Extra Protection Wall Mount for harsh environments, and supporting debris hoods and conduit plate kits.
- Standard Power Structure — The PowerFlex 750-Series share a common power structure to provide the same physical footprint and power range no matter what PowerFlex 750 -Series drive is used.

19.7 PowerFlex® 520 Series (523, 525, & 527) AC Drives

http://ab.rockwellautomation.com/Drives/PowerFlex-525

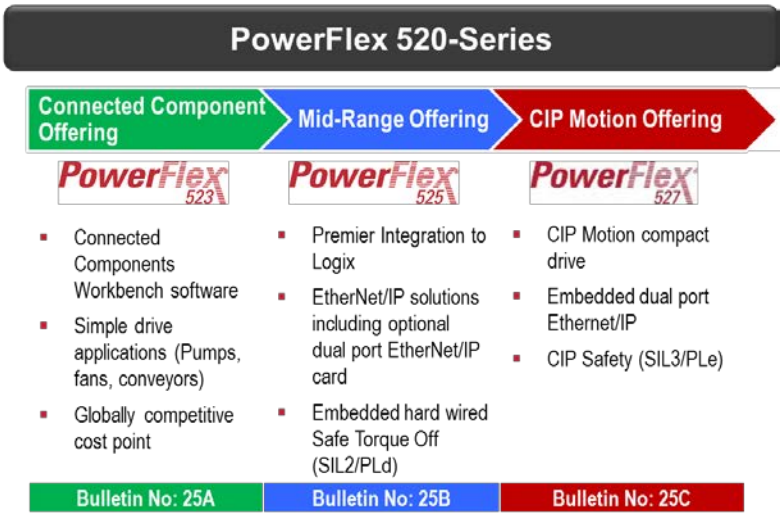
The Next Generation of Powerful Performance and Flexible Control

The new family of Allen-Bradley® PowerFlex® 520 AC drives deliver an innovative design that is remarkably versatile and can accommodate systems ranging from standalone machines to simple system integration.

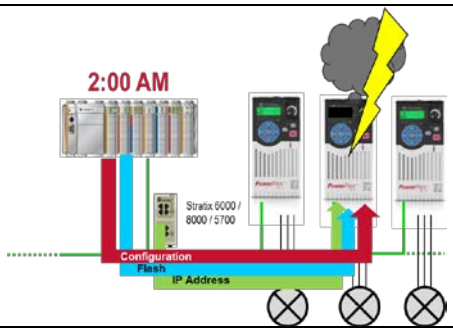
By combining a variety of motor control options, communications, energy savings and standard safety features in a cost-effective drive, the PowerFlex 520 drives are suitable for a wide array of applications. See how the PowerFlex 520 AC drives can help you maximize your system performance and reduce your time to design and deliver better machines.

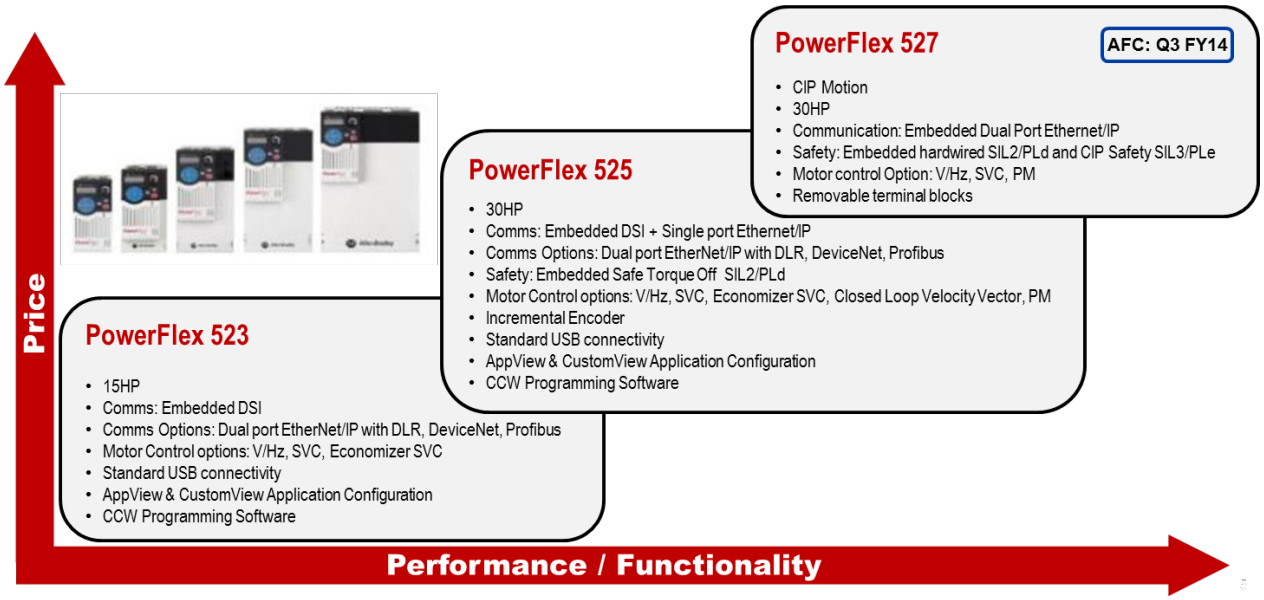
Leading Class - Common Attributes

- Power ratings of 0.4 to 22 kW/0.5 to 30 Hp at 380/480V
- Global voltage classes from 100-600V; Allow -15% / +10% input voltage
- The modular design features an innovative removable control module that allows installation and configuration at the same time to help increase productivity
- An embedded port for EtherNet/IP™ supports seamless integration into the Logix environment and EtherNet/IP networks
- Optional dual port EtherNet/IP card provides more connectivity options, including device level ring (DLR) Functionality
- Programming with intuitive software and configure drives faster using a standard USB interface
- A dynamic LCD human interface module (HIM) supports multiple languages and features descriptive QuickView™ scrolling text
- Get your drive up and running faster with application specific parameter groups for applications like conveyors, mixers, pumps and fans using the AppView™ tool
- Define your own group of parameters with the CustomView™ tool
- Help reduce energy costs with Economizer mode, energy monitoring features and permanent magnet motor control*
- Help protect personnel with embedded Safe Torque-Off
- Endures high ambient temperatures up to 50°C (122°F); and with current derating and a control module fan kit, up to 70°C (158°F)
- A wide range of motor control:
    - Volts/ Hertz
    - Sensorless vector control (Economizer Mode)
    - Closed loop velocity vector control
    - Control for permanent magnet motors*
    - Positioning with closed loop feedback allows simple positioning
- Multiple EMC filtering options
    - Embedded EMC filtering at 1ph 200V & 3ph 400V class
    - Optional external EMC filtering for longer cable length
- Conformal Coating to 3C2 specification (Chemical Gases only)



Innovative Modular Design ▪ Reduces installation and configuration time ▪ Removable control module speeds installation ▪ One control module supports entire power range ▪ No additional size penalty when adding option cards	
Ease of Programming ▪ Studio 5000 Logix Designer: AOPs & ADC ▪ Connected Components Workbench™ Software (CCW) ▪ Dedicated application parameter groups ▪ MainsFree™ programming	
Operation at High Ambient Temperature ▪ Up to 50°C (122°F) ▪ 60°C (140°F) with current derating ▪ Optional fan kit allows 70°C (158°F) operation with current derating	
Communications ▪ Embedded EtherNet/IP *(PowerFlex 525 only)* ▪ Optional Dual Port EtherNet/IP ▪ Option Cards for DeviceNet, Profibus DP	

Safe-Torque Off ▪ Embedded Safe-Torque Off SIL2/PLd standard *(PowerFlex 525 only)*	
Flexible Installation • Industry leading compact footprint • No penalty for adding option cards • Smallest mounting clearances available for top and bottom of drive; requires only 50mm (1.96 in) air-gap space for top and bottom • Allow horizontal & vertical mounting • Zero Stacking up to 45°C (113°F) • Din-Rail mounting for frame A, B and C drives, High ambient temperature till 70°C (158°F)	
Automatic Device Configuration (ADC) ▪ ADC allows a user to configure their Logix system to automatically download a drive's configuration ▪ Ideal for drive replacement ▪ ADC is a version 20 and above feature ▪ Also compliments: Stratix 6000 & 8000 and 5700 switches	


Price
PowerFlex 527
AFC: Q3 FY14
• CIP Motion
• 30HP
• Communication: Embedded Dual Port Ethernet/IP
• Safety: Embedded hardwired SIL2/PLd and CIP Safety SIL3/PLe
• Motor control Option: V/Hz, SVC, PM
• Removable terminal blocks
PowerFlex 525
• 30HP
• Comms: Embedded DSI + Single port Ethernet/IP
• Comms Options: Dual port EtherNet/IP with DLR, DeviceNet, Profibus
• Safety: Embedded Safe Torque Off SIL2/PLd
• Motor Control options: V/Hz, SVC, Economizer SVC, Closed Loop Velocity Vector, PM
• Incremental Encoder
• Standard USB connectivity
• AppView & CustomView Application Configuration
• CCW Programming Software
PowerFlex 523
• 15HP
• Comms: Embedded DSI
• Comms Options: Dual port EtherNet/IP with DLR, DeviceNet, Profibus
• Motor Control options: V/Hz, SVC, Economizer SVC
• Standard USB connectivity
• AppView & CustomView Application Configuration
• CCW Programming Software
Performance / Functionality

19.8 Ultra 3000 Drives

http://ab.rockwellautomation.com/motion-control/ultra3000-servo-drive

The Ultra™ 3000 family provides one global solution through its complete set of servo drive products ranging from simple standalone indexing applications to multi-axis integrated motion. Ranging from 110V to 460V power input, these high-performance, digital servo drives meet global voltage requirements and provide flexibility to perform in a variety of machine control architectures. In addition, the Ultra3000 drive is integrated with the ControlLogix platform via SERCOS interface for integrated motion. The Ultra3000i digital servo drive with indexing adds basic stand-alone control capability to the Ultra3000 feature set.

19.9 ArmorStart IP67 Motor Control Products

http://ab.rockwellautomation.com/Motor-Control/ArmorStart-Distributed-Motor-Controller

The ArmorStart™ Distributed Motor Controller is an integrated, pre-engineered combination starter for full voltage, reversing and VFD applications. The ArmorStart is rated for local-disconnect service by incorporating the Bulletin 140 Motor Protector as the local-disconnect.

- 4 inputs and 2 outputs to be used with sensors and actuators for monitoring the application process.
- LED status indication and built-in diagnostics capabilities.
- IP67/Nema Type 4 enclosure design suitable for water wash down environments.
- Modular “plug and play” design provides simplicity in wiring the installation.
- Quick disconnects for the I/O, communications, and motor connections
- Optional Hand/Off/Auto (HOA) keypad for local start/stop control
- Short circuit protection per UL508E and IEC 60947.

Network and Expandable I/O Capabilities
The ArmorStart Distributed Motor Controller delivers enhanced control to access parameter settings and provides fault diagnostics and remote start/stop control. DeviceNet is the communication protocol, provided with the ArmorStart including DeviceLogix. Selecting the **ArmorPoint** protocol allows the ArmorStart to communicate using DeviceNet or EtherNet/IP.

The two outputs that are provided as standard which are a dual key connector are sourced from the control voltage power of 24V DC and 120V AC. LED status indication is also provided, as standard with the ArmorPoint protocol. When using the ArmorPoint protocol, a maximum of two ArmorPoint Distributed Motor Controllers can be connected to the ArmorPoint Distributed I/O product.

19.9.1 OnMachine ArmorStart IP67 Starter – 280 / 281

The ArmorStart 280 / 281 are Full Voltage starters used in applications requiring across-the-line starting. Full in-rush current and locked-rotor torque are realized. The ArmorStart Bulletin 280 offers full-voltage starting, and the Bulletin 281 offers full-voltage starting for reversing applications.

- Electronic motor overload protection accomplished electronically with an I2t algorithm.
- overload protection is programmable via the communication network
- The overload trip class can be selected for class 10, 15, or 20 protection.
- Ambient insensitivity is inherent in the electronic design of the overload.
- 3-meter unshielded 4-conductor cordset

19.9.2 On Machine ArmorStart with SMC Technology - 283

The Bulletin 283 ArmorStart Distributed Motor Controller is an integrated, pre-engineered starter for solid-state motor control applications. The quick disconnects for the I/O, communications and motor connection reduces the wiring time and eliminates wiring errors.

- Horsepower Range 0.5…10 Hp (0.37…5.5 kW)
- Robust IP67/NEMA Type 4 enclosure rating
- Modular Plug and Play Design
- Quick Disconnect connections for I/O, communications and motor
- 4 Inputs and 2 Outputs (Expandable with ArmorPoint™)
- LED Status Indication
- DeviceNet™ Communications
- DeviceLogix™ Component Technology
- Connectivity to ArmorPoint Distributed I/O Products
- ControlNet and EtherNet Communication via ArmorPoint
- HOA Keypad Configuration, Source Brake Contactor, Safety Monitor

19.9.3 OnMachine ArmorStart IP67 VFD – 284

ArmorStart Distributed Motor Controller offers a simple, cost-effective method of integrating combinations starters, I/O and network capabilities in your on-machine architecture.

- Integrated circuit protection provides for group motor protection
- Disconnect handle – for local disconnect function
- 4 inputs and 2 outputs
- Communication capabilities (DeviceNet™ with built in DeviceLogix™)
- LED status indication, Fault Diagnostics
- Modular Design
- Quick Disconnects for I/O, motor, and communications
- IP67/NEMA 4 enclosure rating
- AC or DC control power for flexibility
- 3-meter unshielded 4-conductor cordset is provided as standard
- 0.5...5 (0.4...4.0 kW) and 200…480V AC, 50/60 Hz
- Electronic motor overload protection accomplished electronically with an I2t algorithm.
- HOA Selector Keypad with Jog Function for local start/stop control: (JOG and Forward/Reverse).

Starting Modes

- Volts per Hertz (Sensorless Vector Performance)
- Sensorless Vector Control

Options

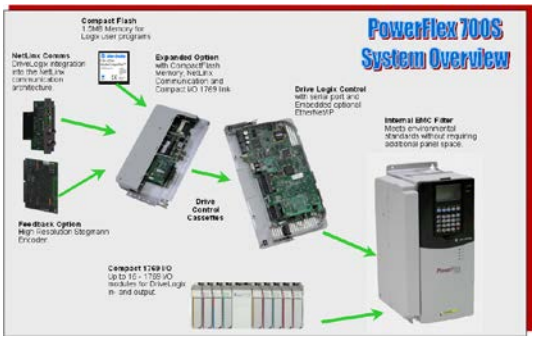
- EMI Filter
- Output Contactor
- Source Brake Contactor
- Dynamic Brake Connector
- 3-meter unshielded 4-conductor cordset or shielded with optional EMI filter

19.9.4 OnMachine ArmorStartLT IP67 VFD – 290/294

ArmorStart LT 294

ArmorStart LT, Bulletin 290/291/294 is an integrated, pre-engineered distributed motor control solution. It provides excellent performance at a great value to meet today's needs in size, simplicity, and performance. It also provides material handling equipment suppliers with a compact footprint which is essential when space is at a premium, without sacrificing performance or functionality. The user will experience premier integration with ArmorStart LT and the Rockwell Automation family of Logix PLCs. ArmorStart LT is available with Full Voltage, Full Voltage Reversing, or Variable Speed motor control performance. It is equipped with a UL Listed At-Motor Disconnect that supports a lock-out tag-out (LOTO) provision. ArmorStart LT is listed suitable for group motor installations per UL and can be applied with either branch circuit breaker protection or fuse protection. It provides a robust IP66/ UL Type 4/12 enclosure suitable for water washdown environments in a single box construction that will minimize inventory needs. All external connections are made from the bottom of the unit. The power, control, and motor connections

are made via a gland plate, as standard. ArmorStart LT provides several standard features. It can be ordered with EtherNet/IP or DeviceNet network support. Each unit will be equipped with quick disconnect receptacles for I/O and the network. Users will experience tools such as a Logix Add-on Profile, Setup Wizards, Auto-generated tags, and embedded webserver support that allows access to status and diagnostics from anywhere in the world. Lastly, the electronic control module (ECM) includes externally accessible node address switches, configurable I/O, and comprehensive status and diagnostics LEDs.



The ArmorStart LT can also be configured with several options that can further reduce installation and commissioning time. Quick disconnects are available for power, control, and motor connections, using ArmorConnect™ cable solutions. A Hand-Off-Auto keypad for local control is an available option. The optional internal power supply (IPS), eliminates the need to run separate control power. ArmorStart LT
Bulletin 294 can be configured with an electromechanical brake connection for the motor brake.

http://ab.rockwellautomation.com/Motor-Control/ArmorStart-LT-Distributed-Motor-Controller

19.10 Drive/Device Logix

http://ab.rockwellautomation.com/drives/software/rslogix-5000-integration-with-drives

The Allen-Bradley PowerFlex®, ArmorStart drives offers high performance drive control, advanced features and built-in diagnostics. It combines the performance and flexible control of drives and I/O with the Logix engine to produce a highly functional control solution for Machining applications.

- Embedded Logix control programmability and control of auxiliary functions.
- Uses the common programming environment RSLogix 5000 and supports multiple programming languages.
- Local connection for up to sixteen 1769 Compact I/O modules established by a cable into the drive control expanded option cassette.
- Compact Flash card for non-volatile user memory storage for up to 1.5 Mbytes
- NetLinx communication board.
- Optional integrated EtherNet/IP module is located on the main drive control cassette and supports distributed I/O.

19.11 ArmorConnect Power Media

http://www.ab.com/en/epub/catalogs/3784140/10676228/4129860/6480313/

- Cordsets
- Patchcords
- Receptacles
- Tees
- Reducers

Three-phase Power Media rated for motor branch circuits per UL 2237

Control Power Media offers a mini disconnect cables that provide a secure connection to the ArmorStart Distributed Motor Controller

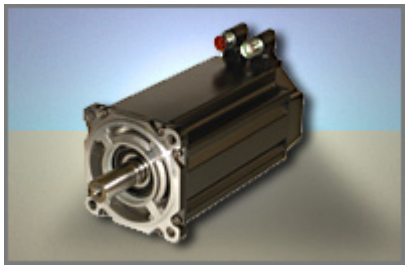
20 Allen Bradley matched AC Motors

http://ab.rockwellautomation.com/Motors

Allen-Bradley drives and motors are Control-Matched as a system to help solve common operating problems:

- Inverter grade motor insulation systems are designed to meet and exceed NEMA MG1 Part 31.40.4.2 standards for resistance to spikes of 1600 volts with a 0.1 microsecond rise time. In addition, each Allen-Bradley Control-Matched motor insulation system is rated for a minimum of 1600 volts CIV (Rockwell Automation test method) at rated operating temperature.
- Reduced electrical and acoustic noise
- Improved dynamic response.
- Cool operating performance.
- Wider torque and speed range.
- Superior service life with a minimum of maintenance

20.1 Servo motor - 1326AB Heavy Duty motors



http://www.rockwellautomation.com/products/customclassics/mc/1326ab.html

Torque Plus motors are high performance, 3Ø, brushless, AC, synchronous servo motors intended to be used with the Kinetix 6000 Servo Drives.

- An extruded aluminum housing for improved heat transfer.
- Multiple feedback options:
  - Rugged, brushless resolver
  - Absolute multi-turn and single-turn encoder
  - Multi-turn encoder
- 100% continuous-rated output torque at stall (zero rpm).
- A UL Listed insulation system (file #E57948).
- Ability to be vertically mounted at any angle with the shaft up or down .
- Three-phase sinusoidal wound stator for smooth operation at low speeds.
- TENV construction, IP 65 rated enclosure, and IP67 optional (IP67 cables must be specified)
- An NC thermal switch in the motor (rated 115V AC/24V DC at 1A) provides thermal overload indication.
- A precision balance of 0.0127 mm (0.0005 in.) total peak-to-peak displacement.
- A CEI/IEC 72-1 metric flange mount with metric shafts.
- 1326AB 460V Torque Plus Servo motors range in continuous torque capability from 2.3 to 53 NM and reach speeds of 7250 RPM.

20.2 Servo motor - MPL Low inertia motors

http://www.ab.com/motion/servomotors/lowinertia.html

MP-Series low-inertia, high output, brushless servo motors are intended to be used with the Kinetix 6000 Digital Servo Drive with SERCOS interface. Available in 5 frame sizes, these motors provide continuous torque capabilities from 1.58 to 150 Nm (14 -1327 lb -in.) and peak torques from 3.61 to 290 Nm (32-2566 lb-in.).

- Integral 24 volt brake option
- Optional Shaft Seal for IP 66 environmental rating
- Absolute Feedback Option
  - Multi-turn and single-turn option provides absolute feedback – no need for a homing routine
  - Up to 2 million counts per revolution, Smooth rotation even at low speeds
  - Ability to control higher load-to-motor rotor inertia ratios while maintaining a stable system.
- Segmented core technology yielding up to 40% higher torque per size than conventional servo motors
- Enhanced winding encapsulation for increased thermal efficiency
- High-energy neodymium magnets for quicker acceleration
- Low profile, field reversible motor connectors for minimal servo motor impact on machine design

20.3 Servo motor – MPM Medium inertia motors

http://ab.rockwellautomation.com/Motion-Control/MP-Series-Servo-Motors

High Performance for Medium Inertia Applications

The MP-Series™ (Bulletin MPM) Medium Inertia Servo Motors offer a compact, power dense, feature-rich solution for applications with heavier loads and greater inertia. Leveraging the proven MP-Series motor technology and quality standards, these new servo motors are ideal for users with print, converting, web handling, automotive, and other applications requiring more power in a smaller package.

Customers who currently use MP-Series Low Inertia Motors will enjoy complete mechanical interchangeability with the new MP-Series Medium Inertia Motors. All couplers, gear boxes, and similar mechanical components are identical, providing convenience for customers using both types of motors. In addition, cable selection and stocking is simplified through the use of DIN standard cables on a complete range of MP-Series motors and actuators.

The MP-Series medium inertia servo motors offer IEC metric mounting dimensions and rotatable DIN connectors that provide flexible connector orientation.

Features

High resolution absolute encoder and resolver feedback

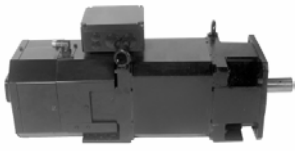
230V AC and 460V AC windings

Multiple winding speed options, optimized for use with Kinetix 6000 (Series B) and Kinetix 6200 servo drives.

High performance segmented stator design

Performance-matched to the legacy 1326AB Medium Inertia Servo Motors, providing a clean migration into the latest MP-Series servo motors

20.4 HPK-Series High Power Induction Servo Motors



http://ab.rockwellautomation.com/Motion-Control/HPK-Series-High-Power-Servo-Motors

HPK Series Servo Motors are high horsepower motors that employ induction motor technology providing high reliability and durability in demanding applications. These AC motors were engineered for optimized performance when used with the Allen-Bradley Kinetix 7000 High Power Servo Drive. Available in five frame sizes, these 460 volt motors provide continuous stall torque from 96 to 482 Nm (849-4266 lb-in.).

- Rated for 200% service factor
- Standard IEC flange and/or foot mount.
- Integral blower cooling allows higher performance in a compact package.
- Motor winding optimized to provide constant torque over a wide speed range.

- High resolution feedback (up to 2 million counts per revolution), Multi-turn absolute feedback option .
- Continuous torque from 96 to 482 Nm (849 to 4266 lb-in.) and peak torque from 192 to 964 Nm (1699 to 8531 lb-in.) with base speeds of 1500 and 3000 rpm.
- Standard DIN feedback connector and junction box for power connections simplify installation wiring.
- Equipped with shaft seal, automatic T-drains, corrosion resistant hardware, and gasketed junction box.
- UL recognized component to applicable UL and CSA standards. CE marked for all applicable directives.

20.5 RDD-Series Direct Drive Motors

http://ab.rockwellautomation.com/Motion-Control/RDD-Series-Servo-Motors

The RDD-Series Motors are designed to deliver dynamic performance along with the benefits of direct drive technology. By connecting directly to the load, these motors eliminate the need for gearboxes, timing belts, pulleys and other mechanical components. The result is reduced system compliance and energy consumption along with faster settling times and better overall control of the load.

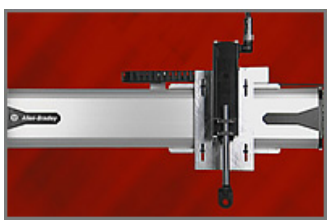
Other benefits include:

- Reduced downtime and maintenance due to simplified mechanics and reduced part count
- Lower total cost of ownership with fewer parts and reduced production losses
- Simplified machine design and improved time to market with Motion Analyzer software tools
- Seamless integration into the Rockwell Automation Integrated Architecture with a single environment for programming, control, and data collection.
- High torque at low speeds to match your application needs

The initial release of the RDD-Series, the Bulletin RDB, incorporates a bearingless housed configuration designed for applications where the load is already supported by its own bearings, such as unwind/rewind stands, web guides and print, nip and feed rolls. Available with a continuous torque range of 5 to 426 Nm, these bearingless motors simplify installation while minimizing package size and alleviating alignment issues between the motor and the load.

The Bulletin RDB bearingless motors feature:

- Continuous torque to 426 Nm
- Bearingless rotor
- Multiple speed options
- Windings optimized for use with the latest Kinetix servo drives
- Heidenhain high resolution absolute encoders, single- and multi-turn options
- Rotatable DIN connectors
- Environmental protection to IP65



20.6 Actuators

http://ab.rockwellautomation.com/Motion-Control/Actuator

Overview

The MP-Series integrated linear motion products provide simplification and time-savings by providing linear actuators and linear stages as completely integrated devices that fit seamlessly into the Rockwell Automation Integrated Architecture™. Just enter your application requirements directly into the Motion Analyzer sizing and optimization software (version 4.4. or later) and a servo-driven linear stage or linear actuator; can be selected based on desired performance, without having to worry about how it will interface with the control system.

21 Power and Energy Management

http://ab.rockwellautomation.com/Energy-Monitoring

21.1 Powermonitor 1000

http://ab.rockwellautomation.com/Energy-Monitoring/1408-PowerMonitor-1000

Energy management and understanding energy costs are a major focus today in the manufacturing industry. The Allen-Bradley Powermonitor 1000 is a cost effective energy monitoring and control solution. The Powermonitor 1000 is perfect for your applications where load profiling, cost allocation, or energy control is required. It can also proide seamless integration into your existing energy monitoring systems where sub-metering is required. The Powermonitor 1000 is available in five models (two transducers, and three energy-monitors), with features and a price point to meet your application.

Transducer models feature the ability to measure voltage, current, and power related tags. Energy-monitor models feature the ability to measure consumption related tags such as real, reactive, and apparent energy. The top of the line energy-monitor (EM3) provides all the features of both the transducer and energy-monitor models.

The Powermonitor 1000 integrates into your existing energy monitoring systems featuring, RSView, RSPower, or RSEnergyMetrix to further enhance the view into energy costs. Your existing Allen-Bradley PLC's (PLC-5, SLC, ControlLogix Family) can also easily communicate to the Powermonitor 1000 to allow energy data to be used in control systems.

Features

- Compact Size
- Available EtherNet/IP, Serial DF1, Modbus RTU, Modbus TCP Communications
- Integrated LCD Display
- Panel or DIN Rail Mounting
- UL, cUL, CE Certifications
- Wiring Diagnostics
- Time of Use (On-Peak, Off-Peak)
- Logs — Energy, Min/Max, Status, and Load Factor
- View Data and Configure Through The Integrated Web Page
- Revenue Meter Accuracy
- Two Status Inputs
- Configurable KYZ Output
- Integration with RSPower™, RSEnergyMetrix®, and RSView®

Applications

- Demand Management
- Electrical SCADA
- Emergency Load Shed
- Electrical Optimization
- Energy Accountability
- HVAC
- Machine Level Monitoring

21.2 Powermonitor 3000

http://ab.rockwellautomation.com/Energy-Monitoring/1404-PowerMonitor-3000

A Compact Power Meter with Enhanced Communications

The Allen-Bradley Powermonitor 3000 is a power quality and sub-metering monitor that is used by energy consumers in critical power and energy management applications. The Powermonitor 3000 meters deploy state-of-the-art dual-port technology, helping customers leverage the high-performance newer networks without the need for cumbersome serial interface bridges.

Features

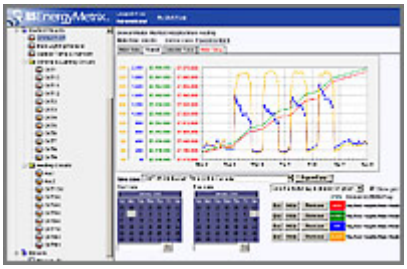
- Many features set the Powermonitor 3000 apart from other power meters such as:
- High-Speed Oscillography — The Powermonitor 3000 provides simultaneous captures of all 7 channels in non-volatile memory with up to 408 cycles per cycle per capture.
- Harmonic Analysis — The Powermonitor 3000 measures percent distortion and magnitude up to the 41st harmonic. It performs harmonic calculations, such as TIF, %THD, K-factor, Crest factor and compliance check to IEEE-519.
- Communications — Every Powermonitor 3000 meter comes with a standard native RS-485 communication port that supports the DF1half-duplex slave protocol and Modbus RTU. It also comes with a variety of additional factory-installed communications options such as EtherNet I/P, DeviceNet,ControlNet, Remote I/O and RS-232. The EtherNet I/P communication card also includes a built-in HTML web page for Internet read access of all critical power and energy data.
- Compact Size — The Powermonitor 3000 meter consists of a master module and an optional display module. The master module mounts easily into existing switchgear or Motor Control Centers (MCCs), eliminating the need for an external enclosure. The display also fits into existing 4-inch ANSI cutouts, which lowers installation costs for both new and retrofitted applications.

Other Valuable Features

- Real-time power monitoring with 50 ms selectable update rate
- Configurable data logs, up to 45,867 records deep
- Event logs that are 100 records deep
- Min-Max logs values for 74 parameters
- Time stamped data logging to nearest 0.01 second
- All logs stored internally in a non-volatile memory
- configurable setpoints

- Projected demand
- Sag and Surge Detection
- Load Factor calculation
- Electronic KYZ pulse output
- Ability to do external demand interval sync via external contact closure or communication
- Support for addressing onboard I/O using Remote I/O discrete data reads
- IEEE 519 power quality pass/fail test
- ANSI C12.16 revenue accuracy, IEC1036, Class 1
- ANSI C37.90-1989 breaker trip ratings, transient and oscillatory
- UL, CUL, CE certified
- PLC-5, SLC 500, and ControlLogix system compatibility
- RSView32 and RSLinx software compatibility

- Powermonitor 3000 has a sub-metering version that contains all of the functionality listed above except:
- High-speed oscillography
- Harmonic analysis
- 10 Configurable setpoints instead of 20
- 50 Event Log records instead of 100
- Sag and surge detection
- Load Factor calculations



21.3 PowerPad Portable Powermonitor (Bulletin 1412)

http://ab.rockwellautomation.com/Energy-Monitoring/1412-PowerPad-PowerMonitor

The PowerPad is a Portable Powermonitor unit that allows you to monitor power anywhere in your facility with superior functionality and accuracy. The lightweight portable unit is self-contained including the Powermonitor, CT's and cables, manuals, and software.

The integrated LCD display provides access to all real-time and accumulated power parameters, power quality measurements including harmonics up to the 50th order, transient detection and capture, device status and configuration, set-point status and configuration, and various alarm options. The unit also comes with an optically isolated RS-232 to be used along with the software for data storage, analysis and report generation communication port.

21.4 RSEnergyMetrix Software

http://www.rockwellautomation.com/rockwellsoftware/assetmgmt/energymetrix/index.html

Overview

RSEnergyMetrix™ is a sophisticated Web-enabled, energy management software package that puts critical energy information at your desktop. The RSEnergyMetrix Software Suite combines data communication, client-server applications, and Microsoft's advanced .NET™ Web technology to provide you with a complete energy-management solution.

With RSEnergyMetrix, you can capture, analyze, store, and share energy data across your entire enterprise via a LAN or WAN using a simple Web browser. This makes it simple to distribute the knowledge you need to optimize energy consumption, which can help improve productivity while lowering energy costs.

RSEnergyMetrix helps managers and engineers solve on-going, energy-related challenges. With RSEnergyMetrix, you can:

- Correlate energy costs to production costs
- Provide accurate cost accounting based on consumption
- Generate energy reports and charts for a process, department, facility or enterprise
- Optimize energy procurement and help negotiate better rates
- Make decisions on electrical capacity
- Avoid unscheduled shutdown
- Procure and analyze energy information with minimum capital investment

21.5 Condition Monitoring Solutions

http://www.rockwellautomation.com/solutions/conditionmonitoring/index.html

Condition monitoring systems or programs help keep your plant floor running productively by detecting potential equipment failures. Previously, a problem was recognized by:

- Noise identified by maintenance people
- Visual identification by operators
- Control system indicators such as temperature or pressure
- Electrical equipment issues such as high current
- Product quality reports

Emonitor® — An Integrated Suite of Maintenance Data Functions

Today's globally competitive economy has resulted in significant shifts in the relationships between producers, suppliers, and consumers. The need for improved production reliability and reduced expenses is clearly demonstrated by production strategies such as "just-in-time" material supply and delivery.

As a manufacturer, to be successful in this environment, it is vital that you optimize your investment in critical production assets. Simply put, to ensure future growth you must maximize your Return on Net Assets [RONA = (Plant Revenue-Costs) / Net Assets]. The Emonitor family of products provides you with a suite of integrated maintenance data functions to leverage information about your assets. This enables you to make intelligent, informed decisions that maximize uptime, reduce inventory, cut production and maintenance costs, and improve your Overall Equipment Effectiveness [OEE = Availability x Rate x Quality].

22 Addendum A: QUICK START MANUALS

22.1 Drives:

PowerFlex: 40

http://literature.rockwellautomation.com/idc/groups/literature/documents/qs/22b-qs001_-en-p.pdf

PowerFlex: 40P

http://literature.rockwellautomation.com/idc/groups/literature/documents/qs/22d-qs001_-en-p.pdf

PowerFlex: 700S

http://literature.rockwellautomation.com/idc/groups/literature/documents/qs/20d-qs001_-en-p.pdf

http://literature.rockwellautomation.com/idc/groups/literature/documents/qs/20d-qs003_-en-p.pdf

22.2 ArmorStart

Selection Guide
http://literature.rockwellautomation.com/idc/groups/literature/documents/sg/280-sg001_-en-p.pdf
ArmorStart Users Manual
http://literature.rockwellautomation.com/idc/groups/literature/documents/um/284-um001_-en-p.pdf

22.3 Stack Light , DeviceNet, 855T

User Manual
http://literature.rockwellautomation.com/idc/groups/literature/documents/um/855t-um001_-en-p.pdf

22.4 Terminal Blocks/Wiring and Connection Systems

http://literature.rockwellautomation.com/idc/groups/literature/documents/ca/a117-ca913_-en-p.pdf

Allen-Bradley I/O Modules Wiring and Pin Outs

http://literature.rockwellautomation.com/idc/groups/literature/documents/wd/cig-wd001_-en-p.pdf

23 Addendum B: GROUNDING PROCEDURES

For General grounding procedures refer all electrical standards, specifications and the Chrysler Powertrain specifications. In addition Rockwell Automation product guidelines can be found on the WEB site at:

The Industrial Automation Wiring and Grounding Guidelines, Publication **1770-4.1**

http://literature.rockwellautomation.com/idc/groups/literature/documents/in/1770-in041_-en-p.pdf

24 Addendum C: Components List

Note: The Components List is project specific and may differ from the list referenced here.

Catalog #	Description	Chrysler NPM Code (NPICS)
	Safety Relays	
440R-C23017	ALLEN BRADLEY 440R-C23017 SAFETY RELAY 24 VCA/CD	22-205-1821
440R-N23198	ALLEN BRADLEY 440R-N23198 solid state safety relay	22-205-1886
440R-J23102	ALLEN BRADLEY MONITORING SAFETY RELAY 24VDC	
440R-E21358	SAFETY RELAY, 24Vac/dc, Inputs (1NC, or 2NC), Outputs (6 N.O.) Aux Outputs (2NC)	
440R-E21358	MSR122 expansion relay, I/P:1NC or 2NC, O/P:6NO, Aux O/P 1NC, 24VAC/DC,	
440R-D23171	ALLEN BRADLEY SAFETY RELAY 1 N.C. + 1 N.O. Inputs (Two-Hand Control), 2 N.O. Safety Outputs, 24VDC	
440R-N23132	ALLEN BRADLEY SAFETY RELAY 440R-N23132	
440R-C23139	ALLEN BRADLEY RELAY- MSR131RTP INPUT 1N.O. &2N.C. CONTACT OUTPUTS 3, AUX CONTACT OUTPUTS 2, SOLID STATE OUTPUTS 2, 115VAC.	22-205-1760
440R-E23191	MSR132 expansion relay, I/P:1NC/2NC, O/P:4NO, Aux O/P 2NC, 24VAC/DC fixed terminals,	
	Time Delay - 0s	
440R-E23192	MSR132 expansion relay, I/P:1NC/2NC, O/P:4NO, Aux O/P 2NC, 24VDC fixed terminals,	

	Time Delay - 0.5s	
440R-E23097	MSR132 expansion relay, I/P:1NC/2NC, O/P:4NO, Aux O/P 2NC, 24VAC/DC,	
	removable terminals, Time Delay - 0s	
440R-E23159	MSR132 expansion relay, I/P:1NC/2NC, O/P:4NO, Aux O/P 2NC, 24VAC/DC,	
	removable terminals, Time Delay - 0.5s	
440R-M23065	ALLEN BRADELY MINOTAUR SAFETY RELAY	22-205-1689
440R-G2321a	MSR142 multi-output relay, 7NO Safety outputs, 4NC (2PNP) Aux Outputs,	
	a = 6 (24VAC/DC)	
440R-C23205	MSR144 multi-output relay, Inputs: 1NC/2NC, Outputs: 2N), Aux Outputs 2NC PNP, 24VDC	
440R-H23176	AB MINOTAUR MSR210P MODULAR SAFETY RELAY BASE UNIT	22-205-1761
440R-H23178	AB MINOTAUR MSR220P MODULAR SAFETY RELAY INPUT MODULE	22-205-1762
440R-H23180	AB MINOTAUR MSR230P MODULAR SAFETY RELAY OUTPUT MODULE	22-205-1763
440R-H23183	AB MINOTAUR MSR240P MODULAR SAFETY RELAY COMMUNICATION MODULE	22-205-1764
440R-H23184	AB MINOTAUR MSR245P MODULAR SAFETY RELAY DISPLAY MODULE	22-205-1765
440R-W23219	MSR310P Base Module (RS232)	
440R-W23218	MSR320P Universal Input Module (Max of 9 can be used with a Muting Lamp Module)	
440R-W23217	MSR329P Muting Lamp Module	
440R-W23221	MSR330P Output Module (Group 1)	
440R-W23222	MSR330P Output Module (Group 2)	
440R-W23223	MSR330P Output Module (Group 3)	
	Cable Pull Switches	
440E-L13043	ALLEN BRADLEY Cable pull E-STOP SWICH	22-204-0543
440E-A13083	ALLEN BRADLEY 30M LRTS INSTALLATION KIT	22-204-0775
440E-A13081	ALLEN BRADLEY 15M LRTS INSTALLATION	22-205-1626
440E-A13082	ALLEN BRADLEY 20M LRTS INSTALLATION KIT	22-204-0776
440E-A13085	ALLEN BRADLEY 75m LIFELINE ROPE TENSIONER INSTALLATION KIT	22-205-1555
440E-A17101	ALLEN BRADLEY SAFETY ACCESSORIES PULLEY	22-205-1553
440E-A13078	ALLEN BRADLEY TENSION SPRING	22-205-1554
440E-A17106	ALLEN-BRADLEY SAFETY ACCESSORY Cable gripper	22-205-1809
440E-A17129	ALLEN-BRADLEY CABLE-RED-125M	22-205-1810
440E-A17112	ALLEN-BRADLEY ACCESSORY TENSIONER SYS	22-205-1811
440E-A17003	ALLEN-BRADLEY EYEBOLT	22-205-1812
	Safety Mats/ Controller	
440F-M0612BBNN	300 x 600 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9005
440F-M0618BBNN	300 x 900 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9006
440F-M0624BBNN	300 x 1200 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9007
440F-M0912BBNN	450 x 600 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9008
440F-M1212BBNN	600 x 600 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9009
440F-M1812BBNN	900 x 600 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9010
440F-M1818BBNN	900 x 900 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9011
440F-M1224BBNN	1200 x 600 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9012

440F-M1824BBNN	1200 x 900 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9013
440F-M2424BBNN	1200 x 1200 mm w/4.5 meter (15ft) 2-wire cables exit out the B corners, Black w/out trim.	78-276-9014
440F-C28024	24 VDC max. 8 mats Cable gland for connection of mats, for use with "BB"	78-276-9001
440F-M0612CBNN	300 x 600 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M0618CBNN	300 x 900 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M0624CBNN	300 x 1200 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M0912CBNN	450 x 600 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M1212CBNN	600 x 600 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M1812CBNN	900 x 600 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M1818CBNN	900 x 900 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M1224CBNN	1200 x 600 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M1824CBNN	1200 x 900 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-M2424CBNN	1200 x 1200 mm w/9.1 meter (30ft) One 4 wire cable with M12 connector exits out of upper left, Black w/out trim.	
440F-T3220	Active uniting to join two mats, 2 meter (6.5ft) length square ends.	78-276-9040
440F-T3210	Standard primeter Aluminium, 2 meter (6.5ft) length square ends.	78-276-9041
440F-T3012	External conner standard primeter Aluminium.	78-276-9042
440F-T3013	Internal conner standard primeter Aluminium.	
440F-C28011	24 VDC max. 8 mats 8 - M12 connectors for connection of mats, for use with "CB"	
440F-C28024	SAFETY MAT CONTROLLER, ALLEN-BRADLEY GUARDMASTER 24VDC 8 MAT CONNECTIONS	78-276-9001
	Safety Gate Switches	
440G-MT47126	Solenoid w/ mini QD connector	22-205-2094
440K-MT55138	(MT-GD2) non-Solenoid w/ mini QD connector 2 N.C. 1 N.O.	22-205-2093
440N-S32024	ALLEN BRADLEY SIPHA SENSOR	22-205-1411
440N-S32021	ALLEN BRADLEY SIPHA 2 CONTROL UNIT 2	22-205-1412
440N-S32036	ALLEN BRADLEY SWITCH-SIPHA MAG SAFETY 24VDC & 120 VAC	22-205-1791
440N-Z21S16a	ALLEN BRADLEY SensaGuard M18 barrel, plastic, 18mm target, 2 Safety Outputs, 1 Aux Output	
	a = H (8 Pin Micro Pigtail)	
	A (3m Cable)	
	B (10m Cable)	
440N-Z21S26a	ALLEN BRADLEY SensaGuard M18 barrel, plastic, 30mm target, 2 Safety Outputs, 1 Aux Output	
	a = H (8 Pin Micro Pigtail)	
	A (3m Cable)	
	B (10m Cable)	
440N-Z21S17a	ALLEN BRADLEY SensaGuard M18 barrel, Stainless Steel, 18mm target, 2 Safety Outputs, 1 Aux Output	
	a = H (8 Pin Micro Pigtail)	
	A (3m Cable)	
	B (10m Cable)	
871A-SCBP18	SensaGuard Mounting Bracket	
871A-BP18	SensaGuard Mounting Bracket	
871A-BRS18	SensaGuard Mounting Bracket	

60-2649	SensaGuard Mounting Bracket	
	Safety Contactors	
100SA11	ALLEN BRADLEY CONTACTOR 100SA11	22-204-0469
70A86	ALLEN BRADLEY COIL 120 VAC	22-204-0470
100SA02	ALLEN BRADLEY AUXILLARY CONTACT	22-204-0639
100SA20	ALLEN BRADLEY AUXILLARY CONTACT	22-204-0640
100S-A10	ALLEN-BRADLEY AUX. CONTACT, N.O.	22-204-0785
100S-C23D14C	ALLEN BRADLEY 100S-C23D14C SAFETY CONTACTOR A/B 100S-C23D14C SAFETY CONTACTOR MCS-100S-C	22-204-0891
100S-C12DJ404C	ALLEN BRADLEY SAFTEY CONTACTOR, MECHANICALLY LINKED POOSITIVELY G	22-204-0917
100S-C16DJ404C	ALLEN BRADLEY SAFTEY CONTACTOR MECHANICALLY LINKED POSITIVELY G	22-204-0918
193-EA1DB	ALLEN BRADLEY 193-EA1DB OVERLOAD RELAY	22-204-0919
104-C16DJ22	ALLEN BRADLEY 104-C16DJ22 REVERSING CONTACTOR,4NO MAIN POLES 1NC AUX CONTACT	22-204-0920
100S-C09DJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 24VDC COIL	22-204-1600
100S-C12DJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C12DJ14C 24VDC COIL	22-204-1602
100S-C16DJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C16DJ14C 24VDC COIL	22-204-1604
100S-C23DJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C23DJ14C 24VDC COIL	22-204-1606
100S-C09UDJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C09UDJ14C 24VDC COIL	22-204-1620
100S-C12UDJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C12UDJ14C 24VDC COIL	22-204-1622
100S-C16UDJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C16UDJ14C 24VDC COIL	22-204-1624
100S-C23UDJ14C	ALLEN BRADLEY IEC SAFETY CONTACTOR 100S-C23UDJ14C 24VDC COIL	22-204-1626
104S-C09DJ210C	ALLEN BRADLEY IEC SAFETY REVERSING CONTACTOR 104S-C09DJ210C 24VDC	22-204-1640
104S-C12DJ210C	ALLEN BRADLEY IEC SAFETY REVERSING CONTACTOR 104S-C12DJ210C 24VDC	22-204-1642
104S-C16DJ210C	ALLEN BRADLEY IEC SAFETY REVERSING CONTACTOR 104S-C16DJ210C 24VDC	22-204-1644
104S-C23DJ210C	ALLEN BRADLEY IEC SAFETY REVERSING CONTACTOR 104S-C23DJ210C 24VDC	22-204-1646
	General 100S, 104S, and 700S part number breakdown	
100S-CabcBC	100 S Safety Contactor with Bifurcated Front Mount Aux Contact, 3 Pole, Ie = 9A – 23 A	
	a = Ie [A]: 09 (AC-3 = 9A, AC-1= 32A), 12 (AC-3 = 12A, AC-1= 32A)	
	16 (AC-3 = 16A, AC-1= 32A), 23 (AC-3 = 23A, AC-1= 32A)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only): more options available	
	AJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
	c = Contact Configuration: 05 (Main: 3 N.O., 0 N.C. ; Aux 0 N.O., 5 N.C.)	
	14 (Main: 3 N.O., 0 N.C. ; Aux 1 N.O., 4 N.C.)	
	304 (Main: 3 N.O., 1 N.C. ; Aux 0 N.O., 4 N.C.)	
	404 (Main: 4 N.O., 0 N.C. ; Aux 0 N.O., 4 N.C.)	
100S-CabcBC	100 S Safety Contactor with Bifurcated Front Mount Aux Contact, 3 Pole, Ie = 30A – 85 A	
	a = Ie [A]: 30 (AC-3 = 30A, AC-1= 65A), 37 (AC-3 = 37A, AC-1= 65A),	

	43 (AC-3 = 43A, AC-1= 85A), 60 (AC-3 = 60A, AC-1= 100A),	
	72 (AC-3 = 72A, AC-1= 100A). 85 (AC-3 = 85A, AC-1= 100A)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only for 100/104S-C09 .. C43): more options available	
	AJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
	Coil Voltage (DC Coils only for 100/104S-C60 .. C85): more options available	
	DJ (24V, w/ Integrated Diode)	
	c = Contact Configuration: 04 (Main: 3 N.O., 0 N.C. ; Aux 0 N.O., 4 N.C.)	
	14 (Main: 3 N.O., 0 N.C. ; Aux 1 N.O., 4 N.C.)	
100S-CabcBC	100 S Safety Contactor with Bifurcated Front Mount Aux Contact, 4 Pole, Ie = 9A – 23 A	
	a = Ie [A]: 09 (AC-3 = 9A, AC-1= 32A), 12 (AC-3 = 12A, AC-1= 32A)	
	16 (AC-3 = 16A, AC-1= 32A), 23 (AC-3 = 23A, AC-1= 32A)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only): more options available	
	AJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
	c = Contact Configuration: 404 (Main: 4 N.O., 0 N.C. ; Aux 0 N.O., 4 N.C.)	
	304 (Main: 3 N.O., 1 N.C. ; Aux 1 N.O., 4 N.C.)	
104-S-CabcBC	104 S Reverse Safety Contactor with Bifurcated Front Mount Aux Contact, Ie = 9A – 23 A	
	a = Ie [A]: 09 (AC-3 = 9A, AC-1= 32A)	
	12 (AC-3 = 12A, AC-1= 32A)	
	16 (AC-3 = 16A, AC-1= 32A)	
	23 (AC-3 = 23A, AC-1= 32A)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only for 100/104S-C09 .. C43): more options available	
	AJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
	c = Contact Configuration: 012 (Aux 0 N.O., 6 N.C.) -OR- 210 (Aux 1 N.O., 5 N.C.)	
104-S-CabcBC	104 S Reversing Safety Contactor with Bifurcated Front Mount Aux Contact, Ie = 30A – 85 A	
	a = Ie [A]: 30 (AC-3 = 30A, AC-1= 65A), 37 (AC-3 = 37A, AC-1= 65A),	
	43 (AC-3 = 43A, AC-1= 85A), 60 (AC-3 = 60A, AC-1= 100A),	
	72 (AC-3 = 72A, AC-1= 100A). 85 (AC-3 = 85A, AC-1= 100A)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only for 100/104S-C09 .. C43): more options available	
	AJ (24V, Standard), DJ (24V, w/ Integrated Diode)	

	Coil Voltage (DC Coils only for 100/104S-C60 .. C85): more options available	
	DJ (24V, w/ Integrated Diode)	
	c = Contact Configuration: 010 (Aux 0 N.O., 5 N.C.)	
	210 (Aux 1 N.O., 5 N.C.)	
	Safety Relays	
700S-CFBabC	700S Safety Control Relays with Gold Plated Bifurcated Front Mount Aux Contact,	
	AC-12: Ie = 10A @ 40° C, 6A @ 60° C	
	AC-15: Ie = 3A @ 24V, 2A @ 400V, 0.7A @600-690V	
	a = Contact Configuration: 440 (Main: 3 N.O., 1 N.C. ; Aux 1 N.O., 3 N.C.)	
	530 (Main: 3 N.O., 1 N.C. ; Aux 2 N.O., 2 N.C.)	
	620 (Main: 3 N.O., 1 N.C. ; Aux 3 N.O., 1 N.C.)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only): more options available	
	ZJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
700S-CFabC	700S Safety Control Relays with Standard Contacts,	
	AC-12: Ie = 10A @ 40° C, 6A @ 60° C	
	AC-15: Ie = 3A @ 24V, 2A @ 400V, 0.7A @600-690V	
	a = Contact Configuration: 440 (Main: 3 N.O., 1 N.C. ; Aux 1 N.O., 3 N.C.)	
	530 (Main: 3 N.O., 1 N.C. ; Aux 2 N.O., 2 N.C.)	
	620 (Main: 3 N.O., 1 N.C. ; Aux 3 N.O., 1 N.C.)	
	b = Coil Voltage (AC Coils only): more options available	
	KJ (24V, 50/60Hz), KF (230V, 50/60Hz), KB (440V, 50/60Hz), B (480V, 60Hz)	
	Coil Voltage (DC Coils only): more options available	
	ZJ (24V, Standard), DJ (24V, w/ Integrated Diode)	
700S-Pab	700S-P Control Relays, 10A@600VAC / 5A@600VDC, AC Coils, Open Type Panel Mount Relay Rail Mount	
	a = Contact Configuration:	
	310 (3 N.O., 1 N.C), 220 (2 N.O., 2 N.C.), 710 (7 N.O., 1 N.C.), 620 (6 N.O., 2 N.C.),	
	530 (5 N.O., 3 N.C), 440 (4 N.O., 4 N.C.), 350 (3 N.O., 5 N.C.), 1020 (10 N.O, 2 N.C.)	
	b = AC Voltage Suffix code: A24 (24V), A1 (115-120), A4 (460-480)	
700S-DCPab	700S-P Control Relays, 10A@600VAC / 5A@600VDC, 24VDC Coils,	
	a = Contact Configuration:	
	310 (3 N.O., 1 N.C), 220 (2 N.O., 2 N.C.), 710 (7 N.O., 1 N.C.), 620 (6 N.O., 2 N.C.),	
	530 (5 N.O., 3 N.C), 440 (4 N.O., 4 N.C.), 350 (3 N.O., 5 N.C.), 1020 (10 N.O, 2 N.C.)	
	b = Z24 (Open Type Panel Mount Relay Rail Mount), DZ24 (Open Type DIN Rail Mount)	
700S-PKab	700S-P Control Relays,c 20A@600VAC / 10A@600VDC, AC Coils,	
	a = Contact Configuration:	
	310 (3 N.O., 1 N.C), 710 (7 N.O., 1 N.C.), 620 (6 N.O., 2 N.C.),	
	530 (5 N.O., 3 N.C), 440 (4 N.O., 4 N.C.), 350 (3 N.O., 5 N.C.), 1020 (10 N.O, 2 N.C.)	
	b = A1 (Open Type Panel Mount Relay Rail Mount), DA1 (Open Type DIN Rail Mount)	

700S-DCPKab	700S-P Control Relays, 20A@600VAC / 10A@600VDC, DC Coils,	
	a = Contact Configuration:	
	310 (3 N.O., 1 N.C), 710 (7 N.O., 1 N.C.), 620 (6 N.O., 2 N.C.),	
	530 (5 N.O., 3 N.C), 440 (4 N.O., 4 N.C.), 350 (3 N.O., 5 N.C.), 1020 (10 N.O, 2 N.C.)	
	b = Z24 (Open Type Panel Mount Relay Rail Mount), DZ24 (Open Type DIN Rail Mount)	
	Safety Disconnects	
1494G-DF3N6-98	AB 1494G-DF3N6-98 ENCLOSED DISCONNECT SWITCH 3 POLE 3 PHASE NON-FUSIBLE WITH N.O. AUX CONTACT FACTORY INSTALLED	22-209-0746
1494G-FF3J6	AB ENCLOSED DISCONNECT 400A, TYPE 3R/4/12 - ENCLOSURE CODE "F"	22-209-0833
1494G-BF3N-98-412	ALLEN BRADLEY ENCLOSED DISCONNECT ALLEN BRADLEY 1494G-BF3N-98-412 ENCLOSED DISCONNECT 30 AMP NON FUSEABLE	22-209-0847
1494G-CF3R6	ALLEN-BRADLEY 1494G-CF3R6 60A DISCONNECT SWITCH, ENCLOSED	22-209-0859
1494GX-BF3J6	ALLEN BRADLEY DISCONNECT BOX	22-204-0825
1494G-bcdefg	1494G Enclosed Disconnect Safety Switch in standard size enclosure, 600V, 30 – 600A	
	b = Switch Rating: 30 (30A) , 60 (60A), 100 (100A), 200 (200A), 400 (400A, 600 (600A)	
	c = Enclosure Type:	
	F (Type 3R/4/12), C (Type 4/4X), S (Type 4/4X), K (Type 12)	
	d = Poles: 2 (2 pole, 1 phase), 3 (3-pole, 3 phase), 6 (6 pole, 3 phase)	
	e = Fusing: N (Non-fusible), H (Class H), J (Class J), R (Class R)	
	f = Fuse Voltage: 6 (600VAC/DC)	
	g = Options	
	Safety Connection Systems	
898R-P68MT-A5	Safety Wired Distribution box, Dual-Channel 2NC, plus individual Enunciation, 8 port,	
	10-30VDC, 5 m	
898R-P68MT-A10	Safety Wired Distribution box, Dual-Channel 2NC, plus individual Enunciation, 8 port,	
	10-30VDC, 10 m	
898R-61MU-RM	Shorting Plug for unused ports	
889R-F6ECRM-a	Patchcord, straight to straight DC Micro, a = 1,2,3,5, or 10 (m)	
898D-44KT-DM4	Safety Wired Distribution box, Dual-Channel NC/NO, No Enunciation, 4 port, 10-30VDC	
898D-48KT-DM4	Safety Wired Distribution box, Dual-Channel NC/NO, No Enunciation, 8 port, 10-30VDC	
898D-41KU-DM	Shorting Plug for unused ports	
898D-44LT-DM4	Safety Wired Distribution box, Dual-Channel NC, No Enunciation, 4 port, 10-30VDC	
898D-48LT-DM4	Safety Wired Distribution box, Dual-Channel NC, No Enunciation, 8 port, 10-30VDC	
898D-41LU-DM	Shorting Plug for unused ports	
898D-F4ACDM-a	Patchcord, straight to straight DC Micro, replace a with 1,2,3,5 or 10 (m)	
898D-43LY-D4	T-Port/Splitter, Dual-Channel w/ 4pin DC Micro, PUR body, 10-30VDC, 3A, 2 NC	
898D-43KY-D4	T-Port/Splitter, Dual-Channel w/ 4pin DC Micro, PUR body, 10-30VDC, 3A, 1 NC, 1NO	
	Monitors	
813S-E2BZJ60	Phase Monitor: 150-500V AC, 60 Hz	
	Supply Voltage 24Vdc (115 Vac, 230Vac available), (50 Hz available)	
813S-E2CZJ60	Phase Monitor: 250-690V AC, 60 Hz	
	Supply Voltage 24Vdc (115 Vac, 230Vac available), (50 Hz available)	

809S-E1ZJ	Current Monitor: 0.5-5A AC/DC (1Ø), 2-24.9V, 20-249V,	
	Supply Voltage 24Vdc (115 Vac, 230Vac available)	
809S-E2ZJ60	Current Monitor: 2-15A AC/DC (1Ø), 60 Hz	
	Supply Voltage 24Vdc (115 Vac, 230Vac available), (50 Hz available)	
809S-E3ZJ60	Current Monitor: 0.5-5A AC/DC (3Ø), 60 Hz	
	Supply Voltage 24Vdc (115 Vac, 230Vac available), (50 Hz available)	
809S-CT1	Current Transformers - For 809S-E1, -E3, Trip Current 4.2-50 A	
809S-CT2	Current Transformers - For 809S-E1, -E3, Trip Current 17-200 A	
809S-CT3	Current Transformers - For 809S-E1, -E3, Trip Current 42-500 A	
809S-CT4	Current Transformers - For 809S-E1, -E3, Trip Current 100-1200 A	
817-E1	Thermistor Monitor: Automatic Reset, Supply Voltage 24-240V AC/DC	
817-E2	Thermistor Monitor: Automatic, Manual, or Remote Reset, Supply Voltage 24-240V AC/DC	
819-E1	Motor Speed Monitor: Max Voltage 400 V AC (IEC), 300V AC (CSA/UL)	
	Supply Voltage 24Vdc (115 Vac, 230Vac available)	
819-E2	Motor Speed Monitor: Max Voltage 690 V AC (IEC), 600V AC (CSA/UL)	
	Supply Voltage 24Vdc (115 Vac, 230Vac available)	
	Stack Lights	
855TCB24Y4Y3Y6Y8	Assembled 4 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TVB24Y4Y3Y6Y8	Assembled 4 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TEB24 Y4Y3Y6Y8	Assembled 4 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TCDM1B24 Y4Y3Y6Y8	Assembled 4 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TVDM1B24 Y4Y3Y6Y8	Assembled 4 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TEDM1B24 Y4Y3Y6Y8	Assembled 4 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TCB24 Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TVB24 Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired,Clear Yellow Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TEB24 Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TCDM1B24Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TVDM1B24Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	

855TEDM1B24Y7Y8Y6Y3Y4	Assembled 5 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V DC DeviceNet Micro-Connection, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855TB24TLx	Light Module, Steady LED Module, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855TB24GLx	Light Module, Flashing LED Module, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855TB24BRx	Light Module, Strobe, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855T-BCBC	Mounting Base, Surface Mount, Black with Cap	
855T-BPM10C	Base, 10mm pole, Black with Cap	
855T-BPM25C	Base, 25mm pole, Black with Cap	
855T-BPM40C	Base, 100mm pole, Black with Cap	
855T-BVMC	Base, Right Angle Bracket / Vertical Mount With Cap	
855T-DM2BPM25C	Base, DeviceNet Micro-connect with 1 m cable, 25mm pole, Black with cap	
855TDM2BVMC	Base, DeviceNet Base With Right Angle Bracket And Mini Receptacle	
	Assembled 4 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855ECB24Y4Y3Y6Y8		
855EMB24Y4Y3Y6Y8	Assembled 4 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855EVB24Y4Y3Y6Y8	Assembled 4 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Yellow Steady LED (bottom), Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855ECB24Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Surface Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855ECB24Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, Right Angle Bracket / Vertical Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855ECB24Y4Y3Y6Y8Y7	Assembled 5 LED-Stack Light, 25cm Pole Mount With Cap, Black Housing, 24V AC/DC Full Voltage Wired, Clear Steady LED (bottom), Yellow Steady LED, Blue Steady LED, Green Steady LED, Red Steady LED (top)	
855E24TLx	Light Module, Steady LED, Black, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855E24GLx	Light Module, Flashing LED, Black, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855E24BRx	Light Module, Strobe, Black, 24 VDC	
	x = 8 (yellow), 7 (clear), 6 (blue), 5 (amber), 6 (blue), 4 (red), 3 (green)	
855EB24SA3	Sound Module, Black, 24 VDC, Single Circuit, Single Tone	
855EBCBC	Stack Light Base Unit, With Top Cover, 24 VDC	
855EBVMC	Stack Light Base Unit Vertical Mount, With Top Cover, 24 VDC	
855EBPM10	Stack Light, Support Tube, 100mm	
855E-BCBC	Mounting Base, Surface Mount, Black with Cap	
855E-BPM10C	Base, 10mm pole, Black with Cap	
855E-BPM25C	Base, 25mm pole, Black with Cap	
855E-BPM40C	Base, 40mm pole, Black with Cap	
855E-BVMC	Base, Right Angle Bracket / Vertical Mount With Cap	
855H-BabD	Industrial Horns	
	a = D30 (10-30VDC), A24 (24 VAC), A10 (110 VAC), A20 (230VAC)	
	b = A (100dB / 10 tone gray), B (104dB / 32 tone gray), C (112dB / 32 tone gray),	
	D (119dB / 45 tone gray), E (126dB / 45 tone gray)	

855B-GMS24Ra	Mini square Beacons, 24VDC	
	a = 3 (green), 4 (red), 6 (blue), 7 (clear), 8 (white)	
855Ba-b24cd	Round Beacons, 24 VDC	
	a = M (120 mm), L (160 mm)	
	c = DH (steady halogen), FH (flashing halogen), RH (rotating halogen), BR (strobe)	
	d = 3 (green), 4 (red), 6 (blue), 7 (clear), 8 (white)	
855Ba-LH24	Lamps, halogen, 24 VDC	
	a = M (120 mm), L (160 mm)	
855Ba-AbLc	Lenses	
	a = M (120 mm), L (160 mm)	
	b = S (replacement smooth lens) or F (replacement fresnel lens)	
	c = 3 (green), 4 (red), 6 (blue), 7 (clear), 8 (white)	
855Ba-AbAc	Power Module Assemblies	
	a = M (120 mm), L (160 mm)	
	b = R (replacement rotating power), D (replacement steady power),	
	F (replacement flashing power), B (replacement strobe power)	
	c = 3 (green), 4 (red), 6 (blue), 7 (clear), 8 (white)	
855Ba-b	Miscellaneous accessories and replacement parts	
	a = M (120 mm), L (160 mm)	
	b = ALSG (lens gaskets), AMM (magnetic mount), ASFG (surface mount gaskets),	
	AMTG (Metric tube gaskets), AWP (rough wall plate, AVM (vertical bracket),	
	LS (strobe tube), ABS (surface mount base), ABT (tube mount base)	
	Sensors	
	Other sensing modes available	
42GRU-9200-QD	Standard Polarized Retro, 4 pin DC Micro, 10-40V DC, 30mA,	
42GRP-9000-QD	Standard Diffuse, 4 pin DC Micro, 10-40V DC, 30mA, 5 foot range: 10' and 15' available	
42GRR-9000-QD	Standard Transmitted Beam Rec, 4 pin DC Micro, 10-40V DC, 15mA	
42GRL-9000-QD	Standard Transmitted Beam Source, 4 pin DC Micro, 10-264V AC/DC, 15mA	
889D-F4AC-2	Recommended 4-pin DC Micro QD cordset (-2 = 2m)	
42CM-a8P-b	18mm Metal Cylindrical, Class 1 Laser Sensor, PNP	
	a = D8M (Standard Diffuse),	
	E8Z (Transmitted Beam-Light Source), R8M (Transmitted Beam LO/DO)	
	b = A2 (2m 300V cable) or D4 (4-pin DC micro)	
	example: 42CM-E8EZB-A2 (transmitted beam, o/p Light Source, 2m 300V cable)	
	example: 42CM-R8MPB-D4 (tramsmitted beam, LO/DO, PNP, 4-pin micro)	
	Other sensing modes available	
42EF-P2MPB-F4	Polarized Retro, 10.8-30V DC, 35mA, 0.25–3m sensing dist, PNP, 4pin DC micro QD	
42EF-D1MPAK-F4	Standard Diffuse, 10.8-30V DC, 35mA, 0.03–3m sensing dist, PNP, 4pin DC micro QD	
42EF-R9MPBV-F4	Transmitted Beam Rec, 10.8-30V DC, 25mA, PNP, 4pin DC micro QD	
42EF-E1EZB-F4	Transmitted Beam Source, 10.8-30V DC, 4m operate dist, 25mA, 4pin DC micro QD	
42EF-USKBB-F4	Retroreflective, 10.8-30V DC, 25mm-4.5m operate dist, NPN and PNP 100mA, Dark Operate, 4pin DC micro QD	
423F-U2JBB-F4	Retroreflective, 10.8-30V DC, 25mm-4.5m operate dist, NPN and PNP 100mA, Light Operate, 4pin DC micro QD	
889D-F4AC-2	Recommended DC Micro QD cordset (-2 = 2m)	

42EF-P8KBC-F4	18mm Right Angle Polarized Retroreflective, 24VDC, 50mm – 15M sensing distance, Teach adjustment, Dark Operate, NPN and PNP 100mA, 4-pin DC micro QD	
42EF-P8JBC-F4	18mm Right Angle Polarized Retroreflective, 24VDC, 50mm – 15M sensing distance, Teach adjustment, Light Operate, NPN and PNP 100mA, 4-pin DC micro QD	
42EF-D8KBA-F4	18mm Right Angle Standard Diffuse, 24VDC, 300mm sensing distance, Single-Turn Knob adjustment, Dark Operate, NPN and PNP 100mA, 4-pin DC micro QD	
42EF-R7KBB-F4	18mm Right Angle Standard Diffuse, 24VDC, 300mm sensing distance, Single-Turn Knob adjustment, Light Operate, NPN and PNP 100mA, 4-pin DC micro QD	
42EF-R7JBB-F4	18mm Right Angle Transmitted Beam, 24VDC, 15mm-40m sensing distance, Dark Operate, NPN and PNP 100mA, 4-pin DC micro QD	
45BPD-8LTB1-D5	45BPD Laser Sensor, sensing range 30-100mm, measuring range 70mm	
45BPD-8LTB2-D5	45BPD Laser Sensor, sensing range 80-300mm, measuring range 220mm	
45BRD-8JKB1-D4	45BPR Laser Sensor, sensing range 45-85mm, measuring range 40mm	
45CPD-8LTB1-D5	45CPD Laser Sensor, sensing range 200-6000mm, measuring range 5800mm	
42KL-P2LB-F4	Polarized Retro, 10.8-30V DC, 35mA, 0.25-2m sense dist, PNP, 4pin DC Micro	
42KL-D1LB-F4	Standard Diffuse, 10.8-30V DC, 35mA, 1-380mm sense dist, PNP, 4pin DC Micro	
42KL-RLB-F4	Transmitted Beam Rec, 10.8-30V DC, 35mA, 30m sense dist, PNP, 4pin DC Micro	
42KL-E1EZB-F4	Transmitted Beam Source, 10.8-30V DC, 35mA, 1-30m sense dist, 4pin DC Micro	
889D-F4AC-2	Recommended DC Micro QD cordset (-2 = 2m)	
42CM-abcPd-D4	18mm Metal Cylindrical Photoelectric, 10-30VDC, PNP, 4pin DC Micro	
	a = U (Retroreflective), P (Polarized Retroreflective), D (Standard Diffuse), B (Background	
	Suppression), E (Transmitted Beam-Light Source), R (Transmitted Beam LO/DO)	
	b = 1 (Infrared Beam 880nm) or 2 (Visible Red 660nm)	
	c = M (o/p 100mA-4ms or 2ms), L (o/p 100mA-0.5ms), E (o/p Light Source-Transmitted Beam)	
	d = B (sense dist= 3-4m or 3-20m for Transmitted Beam), AE (sense dist= 0-100mm),	
	AL (sense dist= 0-400mm), BC (sense dist= 50mm), BE (sense dist= 100mm)	
42CF-abcPd-D4	12mm Metal Cylindrical Photoelectric, 10-30VDC, PNP, 4-pin DC micro	
	a = P (Polarized Retroreflective), D (Standard Diffuse),	
	E (Transmitted Beam-Light Source), R (Transmitted Beam LO/DO)	
	b = 1 (Infrared Beam 880nm) or 2 (Visible Red 660nm)	
	c = L (O/p 100mA-1.25ms), E (O/p Light Source-Transmitted Beam)	
	d = A1 (sense dist=3mm-2m for Polarized or 0-100mm Standard Diffuse),	
	A2 (sense dist=0-300mm for Standard Diffuse),	
	B (sense dist= 3-4m o/p Light Source-Transmitted Beam), B1(LO/DO-Transmitted Beam)	
873P-Dabc-d	Ultrasonic Sensor, Analog or Descrete	
	a = B (18mm Barrel Diam) or C (30mm Barrel Diam)	
	b = NP (N.O. PNP), AC (4-20mA), AV (0-10VDC)	
	c = 1 (sense range = 100-600mm for 18mm/30mm Barrel -or- 300-2500mm for 30mm Barrel),	
	2 (sensing range = 200-1500mm -18mm or 30mm Barrel)	
	d = D4 (Micro QD - 18mm Barrel) or D5 (Micro QD - 30mm Barrel)	

873P-DCabc-d	Ultrasonic Sensor, Programmable, 30mm Barrel with Micro QD connection	
	a = AC (2 PNP with 4-20mA), AV (2 PNP with 0-10VDC)	
	b = 1 (sensing range =150-1500mm) or 2 (sensing range = 350-3500mm)	
48MS-SE1PF2-M2	MultiSight Vision Sensor, Focal Length of Lens = 12 mm	
48MS-SE1PF1-M2	MultiSight Vision Sensor, Focal Length of Lens = 6 mm	
	requires external lighting	
	Encoders	
845H-SJabcdeYfg	Incremental Encoder	
	a = D (square flange), E (70mm Diam flange), F (90mm Diam flange), G (Metric Servo 48mm),	
	H (English Servo), J (Metric Servo 42mm)	
	b = A (6mm shaft diam), B (10mm shaft diam), C (1/4in shaft diam), Z (3/8in shaft diam),	
	K (6mm w/ Flat), L (10mm w/Flat), M (1/4in w/Flat), N (3/8in w/Flat), P (3/8in w/double Flat)	
	c = 1 (5VDC) or 2 (8-24VDC)	
	d = 2 (PNP current source), 4 (DLD 5VDC RS422), 6 (DLD 8-24 VDC)	
	e = xx (PPR resolution range 1-5000)	
	f = 1 (Axial Connect End), 2 (Radial Connect Side), A (Axial Cable End), R (Radial cable side)	
	g = BLANK (w/o mating connector), C (with mating connect), 1 (1m), 5 (5m), 9 (9m)	
845T-abcdef-g	Heavy Duty Incremental Encoder	
	a = D (square flange), H (Servo w/ Face mount holes), L (Servo w/o Face mount holes)	
	b = A (6mm shaft diam), B (10mm shaft diam), C (1/4in shaft diam), Z (3/8in shaft diam),	
	K (6mm w/ Flat), L (10mm w/Flat), M (1/4in w/Flat), N (3/8in w/Flat)	
	c = 1 (5VDC in / DLD out), 2 (5VDC in / P-P out), 3 (11-24VDC in / P-P out),	
	4 (11-20VDC in / 5VDC DLD out), 5 (24VDC in / 5VDC DLD out),	
	6 (11-24VDC in / 11-24VDC DLD out)	
	d = 1 (Channel A Only), B (Channel A and B), C (Channel A, B, and Z)	
	e = A (6 Pin connector), B (7 pin connector), E (10 pin connector), P (pigtail cable)	
	f = xx (PPR resolution range 1-3000)	
	g = BLANK (w/o mating connector), C (with mating connect), 1 (1m), 5 (5m), 9 (9m)	
844D-abcdef	Hollow Shaft Incremental Encoder	
	a = A (blind-shaft) or B (through-shaft)	
	b = 4 (1/2" shaft), 5 (5/8" shaft), 6 (3/4" shaft), 7 (7/8" shaft), 8 (1" shaft),	
	9 (1-1/8" shaft), M (30mm shaft)	
	c = A (mount-tether, 1/2" bolt on 7.25" dia to fit 8-1/2" NEMA C)	
	B (mount-tether, 3/8" bolt on 5.88" dia to fit 4-1/2" NEMA C)	
	C (mount-tether, 3/8" bolt on 2.5-4.0" dia radius)	
	D (mount - anti-rotation pin)	
	d = C (10 pin connect), T (terminal block), 1 (1m cable)	
	e = 1 (5VDC in / DLD out), 2 (5-26VDC in / DLD out), 3 (5-15VDC in / DLD out),	
	4 (8-26VDC in / 5VDC DLD out), 5 (10-30VDC in / 10-30VDC push-pull out),	
	f = xx (PPR resolution range 1-3000)	
845G-F3abcdefg	Single Turn Absolute Encoder	
	a = D (square flange), S (English Servo)	
	b = B (Natural Binary), D (Binary Coded Decimal), G (Gray Code)	

	c = 5 (5VDC), 8 (8-24VDC), A (10-30VDC)	
	d = H (High tune), L (Low Tune)	
	e = P (Push-Pull), S (SSI Output),	
	f = xxx (resolution: bit and range from 8bit/0-255 to 15bit/0-32,767)	
	g = A (Axial 19-Pin), R (Radial 19-pin), S (Axial 17-pin), T (Axial 12-Pin), U (Radial 12-pin)	
	Switches	
837E-Da1BN1bc	Temperature Switch, Dual PNP, Stainless Steel, IP68, cULus and CE, 12-24VDC	
	a = A1 (Dual PNP ouput) or C1 (4-20mA output with Single PNP output)	
	b = A1 (Set Pnt = -49°..150C°, Probe length 50mm),	
	A2 (Set Pnt = -49°..150C°, Probe length 100mm)	
	A3 (Set Pnt = -49°..150C°, Probe length 200mm)	
	c = D4 (4-pin DC Micro Cordset)	
889D-F4AC-2	Recommended cordset 2m 4-pin DC micro (straight)	
889D-R4AC-2	Recommended cordset 2m 4-pin DC micro (right angle)	
839E-Da1BAbc-D4	839E Flow Switch, Measures liquids from 0.03-3 m/s, response time 6-12 msec	
	a = A (Dual PNP Output) -or- C (40-20Ma Analog o/p w/ Single PNP Output)	
	b = Process Connection:	
	A1 (1/4 inch NPT – Male), A2 (1/2 inch NPT – Male)	
	A3 (G1/4 BSPP), A4 (G1/2 BSPP)	
	c = Probe Length: A3 (30mm) -or- A2 (100mm)	
	Arrays	
45PVA-1LEB1-F4	Part Verification Array, 5 Optical axes, 100 mm Detection width	
45PVA-1LEB2-F4	Part Verification Array, 5 Optical axes, 225 mm Detection width	
45PVA-1LEB3-F4	Part Verification Array, 5 Optical axes, 300 mm Detection width	
45PVA-1LEB4-F4	Part Verification Array, 5 Optical axes, 375 mm Detection width	
45AST-1JPB1-A2	2 dimensional array, 5 Optical Axis, 0.5-2m, 4ms response time, PNP Output type	
45AST-1JPB2-A2	2 dimensional array, 10 Optical Axis, 150-800 mm, 8ms response, 100mm sensing height, PNP	
45AST-1JNB2-A2	2 dimensional array, 10 Optical Axis, 150-800 mm, 8ms response, 100mm sensing height, PNP	
45AST-1JPB4-A2	2 dimensional array, 10 Optical Axis, 150-800 mm, 8ms response, 150mm sensing height, PNP	
45AST-1JNB4-A2	2 dimensional array, 10 Optical Axis, 150-800 mm, 8ms response, 150mm sensing height, PNP	
	Circuit Protection	
141A-B	141 Mounting System	
1492-SPabccc	1492-SP Supplementary Protector / Miniature Circuit Breaker	
	a = Number of Poles (1, 2, or 3)	
	b = Trip Curve :	
	B (Resistive or Slightly Inductive), C (Inductive), D (Highly Inductive)	
	ccc = Continuous Current Rating (ccc * 0.1 = Amp)	
140M-bcd-eee	140M Motor Protection Circuit Breaker	
	b = C (25A), D (25A), F (45A), I (205A), J (250A), L (400A and 600A)	
	c = 2 (normal break), 8 (High Break)	
	d = E (adj thermal/fixed mag- 13 x in) ,	
	T (adj thermal/fixed mag- fixed at 16-20 x in)	
	eee = rated operational current	
	A (op. current *0.10) – A16 = 0.16	
	B (op. current *1.0) – B16 = 1.6	
	C (op. current *10) – C16 = 16.0	
140M-bcd-eee	140M Motor Circuit Protectors	
	b = C (25A), D (25A), F (45A), H (125A), J (250A),	
	L (400A and 600A), N (800A and 1200A)	

	c = 2 (normal break), 8 (High Break)	
	d = N (Fixed mag- 13 x in), P (adj mag only - less than 13 x in – MCPs),	
	R (adj mag only - greater than 13 x in)– MCPs)	
	eee = rated operational current A (op. current *0.10) – A16 = 0.16	
	B (op. current *1.0) – B16 = 1.6	
	C (op. current *10) – C16 = 16.0	
1492-FB1C30	Din Rail Fuse Holder, 1 Pole, w/o Blown Fuse indicator, Class CC, 30A	
1492-FB1C30-L	Din Rail Fuse Holder, 1 Pole, w Blown Fuse indicator (neon), Class CC, 30A	
1492-FB1C30-D1	Din Rail Fuse Holder, 1 Pole, w Blown Fuse indicator (LED), 24 VDC Class CC, 30A	
1492-FB1C30-D2	Din Rail Fuse Holder, 1 Pole, w Blown Fuse indicator (LED), 48 VDC Class CC, 30A	
1492-FB2C30	Din Rail Fuse Holder, 2 Pole, w/o Blown Fuse indicator, Class CC, 30A	
1492-FB2C30-L	Din Rail Fuse Holder, 2 Pole, w Blown Fuse indicator (neon), Class CC, 30A	
1492-FB3C30	Din Rail Fuse Holder, 3 Pole, w/o Blown Fuse indicator, Class J, 30A	
1492-FB3C30-L	Din Rail Fuse Holder, 3 Pole, w Blown Fuse indicator (neon), Class J, 30A	
1492-FB1J30	Din Rail Fuse Holder, 1 Pole, w/o Blown Fuse indicator, Class L, 30A	
1492-FB1J30-L	Din Rail Fuse Holder, 1 Pole, w Blown Fuse indicator (neon), Class J, 30A	
1492-FB2J30	Din Rail Fuse Holder, 2 Pole, w/o Blown Fuse indicator, Class J, 30A	
1492-FB2J30-L	Din Rail Fuse Holder, 2 Pole, w Blown Fuse indicator (neon), Class J, 30A	
1492-FB3J30	Din Rail Fuse Holder, 3 Pole, w/o Blown Fuse indicator, Class J, 30A	
1492-FB3J30-L	Din Rail Fuse Holder, 3 Pole, w Blown Fuse indicator (neon), Class J, 30A	
1492-FB1J60	Din Rail Fuse Holder, 1 Pole, w/o Blown Fuse indicator, Class L, 60A	
1492-FB1J60-L	Din Rail Fuse Holder, 1 Pole, w Blown Fuse indicator (neon), Class J, 60A	
1492-FB2J60	Din Rail Fuse Holder, 2 Pole, w/o Blown Fuse indicator, Class J, 60A	
1492-FB2J60-L	Din Rail Fuse Holder, 2 Pole, w Blown Fuse indicator (neon), Class J, 60A	
1492-FB3J60	Din Rail Fuse Holder, 3 Pole, w/o Blown Fuse indicator, Class J, 60A	
1492-FB3J60-L	Din Rail Fuse Holder, 3 Pole, w Blown Fuse indicator (neon), Class J, 60A	
	Relays and Contactors	
700DC-PHabc	DC Tandem Contact Cartridge	
	a = 1 (1 N.O, 2pole.), 2 (2 N.O., 2pole), 3 (3 N.O., 4pole), 4 (4 N.O., 4pole),	
	= 5 (6 N.O., 6pole), 6* (6 N.O., 6pole)	
	b = 00 (Open type relay rail mount), 00D (Open Type DIN rail mount), 01 (Type 1 General Purpose)	
	c = Z24 (24 V)	
	* not available in Type 1 General Purpose	
700-ab	AC Tandem Contact Cartridge, Open Type with Pneumatic Time-Delay attachment	
	a = -PPTb (only time delay contacts, relay rail mount), -PPTDb (only time delay contacts, DIN mount)	
	= -PT200b (2 N.O, relay rail mount), -PT400b (4 N.O., relay rail mount),	
	= -PT200Db (2 N.O, DIN rail mount), -PT400Db (4 N.O., DIN rail mount),	
	b = B11 (110-115V, 50Hz), A1 (115-120V, 60Hz), A2 (230-240V, 60Hz), B2 (230-240V, 50Hz),	
	= B3 (380V, 50Hz), A4 (460-480V, 60Hz)	
700-ab	DC Tandem Contact Cartridge, Open Type with Pneumatic Time-Delay attachment	

	a = -PPKb (only time delay contacts, relay rail mount), -PPKDb (only time delay contacts, DIN mount)	
	= -PKT200b (2 N.O, relay rail mount), -PKT400b (4 N.O., relay rail mount),	
	= -PKT200Db (2 N.O, DIN rail mount), -PKT400Db (4 N.O., DIN rail mount),	
	b = Z24 (24 V)	
700-PLab	AC Mechanical Latching Relay, Open Type	
	a = 200 (2 N.O, relay rail mount), 400 (4 N.O., relay rail mount), 600 (6 N.O., relay rail mount)	
	= 200D (2 N.O, DIN rail mount), 400D (4 N.O., DIN rail mount), 600D (6 N.O., DIN rail mount)	
	b = B11 (110-115V, 50Hz), A1 (115-120V, 60Hz), A2 (230-240V, 60Hz), B2 (230-240V, 50Hz),	
	= B3 (380V, 50Hz), A4 (460-480V, 60Hz)	
700DC-PLab	DC Mechanical Latching Relay, Open Type	
	a = 200 (2 N.O, relay rail mount), 400 (4 N.O., relay rail mount), 600 (6 N.O., relay rail mount)	
	= 200D (2 N.O, DIN rail mount), 400D (4 N.O., DIN rail mount), 600D (6 N.O., DIN rail mount)	
	b = Z24 (24 V)	
700-PB20	Adder Deck, Second Deck, 10 A, 2 pole, 2 N.O.	
700-PBK20	Adder Deck, Second Deck, 20 A, 2 pole, 2 N.O.	
700-PB40	Adder Deck, Second Deck, 10 A, 4 pole, 4 N.O.	
700-PBK40	Adder Deck, Second Deck, 20 A, 4 pole, 4 N.O.	
700-PC20	Adder Deck, Third Deck, 10 A, 2 pole, 2 N.O.	
700-PCK20	Adder Deck, Third Deck, 20 A, 2 pole, 2 N.O.	
700-PC40	Adder Deck, Third Deck, 10 A, 4 pole, 4 N.O.	
700-PCK40	Adder Deck, Third Deck, 20 A, 4 pole, 4 N.O.	
700-CPa	Contact Cartridges (Convertible from N.O. to N.C. and N.C. to N.O.	
	a = 1 (standard, 10A), 11Z (Overlap, AC-10A, DC-5A), M (Master, 20A),	
	= R (Logic Reed, 150VAC-0.5A, 30VDC-0.2A), S (Safety, 10A, meets IEC 947-5)	
700-PSaA1	Solid State Timers	
	a = ON DELAY, internal potentiometer: A (0.1-2s), B (0.4-8s), C (1.5-30s), D (6-120s)	
	= OFF DELAY, internal potentiometer: P (0.1-2s), R (0.4-8s), T (1.5-30s), U (6-120s)	
	= ON DELAY, external potentiomter: RA (0.1-2s), RB (0.4-8s), RC (1.5-30s), RD (6-120s)	
	= OFF DELAY, external potentiomter: RP (0.1-2s), RR (0.4-8s), RT (1.5-30s), RU (6-120s)	
700-N3a	Remote Potentiometer	
	a = 4 (0.1-2s), 5 (0.4-8s), 6 (1.5-30s), 7 (6-120s)	
700-Na	Pneumatic Time Delay Unit: 1 N.O. + 1 N.C., range 0.1-60s,	
	a = T (10A), KT (20A)	
700DC-Pab	DC Mechanical Latch	
	a = LL10b (10 A), KLL10b (20A)	
	b = Z24 (24 V)	
	several accessories available	
700-Caabbbcc	Relays, 4 pole (6 and 8 poles available)	
	aa = F (Standard contacts), FB (Gold Plated Bifurcated), FM (Master Contacts)	
	bbb = 220 (2 N.O.+2 N.C.), 310 (3 N.O.+1 N.C.), 400 (4 N.O.+0 N.C.),	
	040 (0 N.O.+4 N.C., not for DC)	
	cc = DJ (24 VDC, 50, 60 Hz)	
100-aabb	Auxiliary Contacts	

	aa = FA (Standard Contact) or FAM (Bifurcated contacts)	
	bb = 02 (0 N.O.+ 2 N.C.), 11 (1 N.O.+ 1 N.C.), 20 (2 N.O.+ 0 N.C.),	
	= 04 (0 N.O.+4 N.C.), 13 (1N.O.+3N.C.), 22 (2N.O.+2N.C.), 31 (3N.O.+1N.C.), 40 (4 N.O+0 N.C.)	
100-FPTabb	Pneumatic Timing Module after delay time	
	a = A (On Delay, with AC coils) or B (Off Delay)	
	bb = 30 (Delay 0.3 - 30 s range) or 180 (Delay 1.8 - 180 s range)	
100-ETAa	Electronic Timing Module after On-Delay time	
	a = 3 (0.1-3 s), 30 (1-30 s), 180 (1-180 s) : 700-CF 110-240 VAC or 110-250VDC coils	
	ZJ3 (0.1 -3 s), ZJ30 (1-30 s), ZJ180 (10-180 s): 700-C with 24-48 VDC coils	
100-ETBa	Electronic Timing Module after Off-Delay time	
	a = KJ3 (0.3-3 s), KJ30 (1-30 s), KJ180 (10-180 s) : 700-CF 24VDC coils	
	3 (0.3 -3 s), 30 (1-30 s), 180 (10-180 s): 700-CF with 110-240 VAC coils	
100-FL11aa	Mechanical Latch	
	aa = J (24 V), D (110-120V), B (480 V)	
100-JE	DC Interface (electronic) between DC (PLC) and AC operating mechanism	
	(Input18 -30VDC, Output 110-240VAC)	
100-FSaaa	Surge Suppressors,	
	aaa = C48 (RC Module, AC Operating, 24-48V, 50/60 Hz) with 700-CF all coils	
	= C280 (RC Module, AC operating, 110-280V, 50/60 Hz), with 100-C AC coils	
	= C480 (RC Module, AC operating, 380-480V, 50/60 Hz), with 100-C AC coils	
	= V55 (Varistor, 12-77 VDC) with 700-C all	
	= V136 (Varistor, 56-136 VAC, 78-180V DC) with 700-C all	
	= V575 (Varistor, 278-575 VAC), with 700-C all	
	= D250 (Diode, 12-250 VDC), with 100-C DC coils	
	More Coil Voltage options available	
700-HC22Z24	700-HC Miniature Square Base “Ice Cube” Relay, 24VDC Coil Voltage, 2PDT, 2-pole, 2 Form C Contacts, 10A = AgNi Contacts. Contact Rating 10A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC22A24	700-HC Miniature Square Base “Ice Cube” Relay, 24VAC Coil Voltage, 2PDT, 2-pole, 2 Form C Contacts, 10A = AgNi Contacts. Contact Rating 10A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC22A24	700-HC Miniature Square Base “Ice Cube” Relay, 120VAC Coil Voltage, 2PDT, 2-pole, 2 Form C Contacts, 10A = AgNi Contacts. Contact Rating 10A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC14A24	700-HC Miniature Square Base “Ice Cube” Relay, 24VAC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNiAu Gold Plated Contacts. Contact Rating 7A.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC14A1	700-HC Miniature Square Base “Ice Cube” Relay, 120VAC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNiAu Gold Plated Contacts. Contact Rating 7A.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	

700-HC14Z24	700-HC Miniature Square Base “Ice Cube” Relay, 24VDC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNiAu Gold Plated Contacts. Contact Rating 7A.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC24A24	700-HC Miniature Square Base “Ice Cube” Relay, 24VAC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNi Silver Plated Contacts. Contact Rating 7A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC24A1	700-HC Miniature Square Base “Ice Cube” Relay, 120VAC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNi Silver Plated Contacts. Contact Rating 7A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HC24Z24	700-HC Miniature Square Base “Ice Cube” Relay, 24VDC Coil Voltage, 4PDT, 4-pole, 4 Form C Contacts, 7A = AgNi Silver Plated Contacts. Contact Rating 7A, C300, R300.	
	Add -3-4 suffix to part number for Push-to-Test and LED Option. Add -4 for LED Option.	
700-HN103	Screw Terminal Socket — Panel or DIN Rail Mounting; Guarded Terminal Construction. Ith = 10 A per pole. 14-Blade miniature socket for use with Bulletin 700-HC Relays.	
700-HN104	Screw Terminal Socket – Panel or DIN Rail Mounting. Guarded Terminal Construction Ith = 10 A per pole. 14-blade miniature socket for use with Bulletin 700-HC relays. This socket has coil and contact separation as well as the ability to plug in optional plug in modules (700-A** accessories: LED, Surge Suppression, Timing Modules)	
700-HN128	Screw Terminal Base Socket — Panel or DIN Rail Mounting; Open Style Construction Ith = 10 A per pole. 14-Blade miniature socket for use with Bulletin 700-HC Relays.	
700-HN114	Retainer Clip Catalog Number for 700-HN103, 700-HN104 or 700-HN128 sockets	
700-HN124	Retainer Clip Catalog Number for 700-HN104 sockets	
700-ADLa	Diode with LED Surge Suppressor, used with 700-HN104 socket	
	a = 1 (6-24VDC), 2 (28-60VDC), 3 (110-220VDC)	
700-AVaR	Varistor with LED Surge Suppressor, used with 700-HN104 socket	
	a = 1 (6-24VAC) or 3 (110-240VAC)	
700-ARa	RC Surge Suppressor, used with 700-HN104 socket	
	a = 1 (6-24VAC/DC) or 2 (110-240VAC/DC)	
700-ATa	Time Module, used with 700-HN104 socket	
	a = 1 (On-Delay, Voltage range 12-24VAC/DC) or 2 (One Short, Voltage range 12-24VAC/DC)	
	More Coil Voltage options available	
700-HB32A24	700-HB Square Base Relay, DPDT, 2-pole, 2 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 24VAC	
700-HB32A1	700-HB Square Base Relay, DPDT, 2-pole, 2 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 120VAC	
700-HB32Z24	700-HB Square Base Relay, DPDT, 2-pole, 2 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 24VDC	
700-HB33A24	700-HB Square Base Relay, 3PDT, 3-pole, 3 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 24VAC	
700-HB33A1	700-HB Square Base Relay, 3PDT, 3-pole, 3 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 120VAC	
700-HB33Z24	700-HB Square Base Relay, 3PDT, 3-pole, 3 Form C, Single AgCdO Contact, 15A B300 Contacts, Coil Voltage 24VDC	
700-HN153	Screw Terminal Socket — Panel or DIN Rail Mounting. Guarded Terminal Construction	

	11-blade socket for use with Bulletin 700-HB and -HJ relays and -HS timing relays. Order must be for 10 sockets or multiples of 10. Safe separation between coil and contacts.	
700-HN154	Screw Terminal Base Socket — Panel or DIN Rail Mounting. Open Style Construction	
	11-blade for use with Bulletin 700-HB and -HJ relays and -HS timing relays.	
700-HN158	Retainer Clip for 700-HN153 socket	
700-HN156	Retainer Clip for 700-HN1534socket	
700-ADR	Diode with Surge Suppressor, used with 700-HN153 socket, Voltage Range 6-220VDC	
700-ADLaR	Diode with LED Surge Suppressor, used with 700-HN153 socket, Voltage Range	
	a = 1 (6-24VDC), 2 (28-60VDC), 3 (110-220VDC)	
700-AVaR	Varistor with LED Surge Suppressor, used with 700-HN153 socket, Voltage Range	
	a = 1 (6-24VDC) or 3 (110-220VDC)	
700-ARa	RC Surge Suppressor, used with 700-HN153 socket	
	a = 1 (6-24VAC/DC) or 2 (110-240VAC/DC)	
700-ATa	Time Module, used with 700-HN153 socket	
	a = 1 (On-Delay, Voltage range 12-24VAC/DC),	
	2 (One Short, Voltage range 12-24VAC/DC)	
700-HT3	Multi-Function Multi-Range Time Module, Voltage Range 12-240VAC/DC, used with 700-HN153 socket, Eight Timing Modes and Seven Timing Ranges.	
700-SCZY3Z25	Photocoupler, Zero Cross Function, LED Indicator, 3A @ 100-240VAC, 5-24VDC Input Control Voltage	
700-SCZY2A1	Photocoupler, Zero Cross Function, LED Indicator, 2A @ 100-240VAC, 100-110VAC Input Control Voltage	
700-SCZY3Z24	Phototriac, LED Indicator, 3A @ 100-240VAC, 24VDC Input Control Voltage	
700-SCNY3Z25	Photocoupler, LED Indicator, 3A @ 4-48VDC, 5-24VDC Input Control Voltage	
700-SCZNY3Z26	Photocoupler, Zero Cross Function, 3A @ 100-240VAC, 4-24VDC Input Control Voltage	
700-SCTN3Z24	Phototriac, 3A @ 100-240VAC, 24VDC Input Control Voltage	
700-SCNN3Z26	Photocoupler, 3A @ 4-48VDC, 4-24VDC Input Control Voltage	
700-SCNN2Z25	Photocoupler, 2A @ 5-110VAC, 5-24VDC Input Control Voltage	
700-HN103	Screw Terminal Socket, Panel or DIN Rail Mounting, Guard Terminal Construction	
700-HN104	Screw Terminal Socket, Panel or DIN Rail Mounting, Guard Terminal Construction, 14 blade miniature socket for use with 700-SC relays.	
700-HN128	Screw Terminal Base Socket, Panel or DIN Rail Mounting, Open Style Construction	
199-DR1	DIN Rail Mounting Pack, 35 X 7.5mm, 1 meter long	
700-AT1	ON-Delay Time Module, 12-24VAC/DC used with 700-HN153 socket	
700-AT2	One Shot Timing Module, 12-24VAC/DC, used with 700-HN153 socket	
700-HN144 series B	Retainer Clip, secures relay in socket. Must be used with 700-SC.	
100-Caabbcc	IEC, Bulletin 100-C contactor, 3 pole with integrated diode, Non-reversing	
	aa = (Amp) where Amp rating can be 09, 12, 16, 23, 30, 37, 43, 60, 72, 85	
	bb = DJ (50/60 Hz, 24VDC)	
	cc = 10 (1 N.O. + 0 N.C.) or 01 (0 N.O. + 1 N.C.)	
100-Caabbccc	IEC, Bulletin 100-C contactor, 4 pole with integrated diode, Non-reversing	
	aa = (Amp) where Amp rating can be 09, 12, 16, 23, 37, 85	
	bb = DJ (50/60 Hz, 24VDC)	

	ccc = 400 (4 N.O. + 0 N.C.), 300 (3 N.O. + 1 N.C.), 200 (2 N.O. + 2 N.C.)	
104-Caabbccc	IEC, Bulletin 104-C contactor, 4 pole with integrated diode, Reversing	
	aa = (Amp) where Amp rating can be 09, 12, 16, 23, 37, 85	
	bb = DJ (50/60 Hz, 24VDC)	
	ccc = 2 (2 N.O. + 2 N.C.), 20 (2 N.O. + 0 N.C.)	
100-CaAbc	IEC, Bulletin 100-C auxiliary contact, max 4 contacts	
	a = F (Front Mount aux contact) or S (Side Mount aux contact)	
	b = 0,1,2,3,4 (N.O. contacts, max 4 including N.C. for Front, Max 2 for Side.)	
	c = 0,1,2,3,4 (N.C. contacts, max 4 including N.O.for Front, Max 2 for Side.)	
	example: 100CFA31 - Front Mount, 3 N.C. + 1 N.O.	
100-FPTabb	Pneumatic Timing Module after delay time	
	a = A (On Delay, with AC coils) or B (Off Delay)	
	bb = 30 (Delay 0.3 - 30 s range) or 180 (Delay 1.8 - 180 s range)	
100-ETAa	Electronic Timing Module after On-Delay time	
	a = 30 (1-30 s), 180 (1-180 s), ZJ30 (1-30 s) : 100-C with DC coils or 700-CF with 24-48 VDC coils	
	ZJ3 (0.1 -3 s), ZJ30 (1-30 s), ZJ180 (10-180 s): 100-C with DC coils	
100-ETBa	Electronic Timing Module after Off-Delay time	
	a = KJ3 (0.3-3 s), KJ30 (1-30 s), KJ180 (10-180 s) : 100-C09..C37 with AC coils	
	3 (0.3 -3 s), 30 (1-30 s), 180 (10-180 s): 100-C with AC coils	
100-MCAaa	Mechanical Interlocks	
	aa = 00 (only without aux contact) or 02 (Mechanical/electrical with 2 N.C.) for all 100-C coils	
100-FLaa	Mechanical Latch	
	aa = J (24 V), D (110-120V), B (480 V)	
100-JE	DC Interface (electronic) between DC (PLC) and AC operating mechanism	
	(Input18 -30VDC, Output 110-240VAC)	
100-FSaaa	Surge Suppressors,	
	aaa = V55 (Varistor, 12-77 VDC)	
	= V136 (Varistor, 56-136 VAC, 78-180V DC) with 100-C all	
	= D250 (Diode, 12-250 VDC), with 100-C DC coils	
100-Daabbcc	IEC, Bulletin 100-D contactor, 3 pole AC Operated, Non-reversing	
	aa = (Amp) where Amp rating can be 95, 110, 140, 180,	
	210, 250, 300, 420, 630, 860A)	
	bb = D (50/60 Hz, 120 VAC), B (60 Hz, 480 VAC), J (50/60 Hz, 24VDC)	
	cc = 00 (0 N.O. + 0 N.C.), 11 (1 N.O. + 1 N.C.)	
104-Daabbcc	IEC, Bulletin 104-D contactor, 3 pole AC Operated, Reversing	
	aa = (Amp) where Amp rating can be 95, 110, 140, 180,	
	210, 250, 300, 420, 630, 860A)	
	bb = D (50/60 Hz, 120 VAC), B (60 Hz, 480 VAC), J (50/60 Hz, 24VDC)	
	cc = 24 (2 N.O. + 4 N.C.)	
100-Daabbcc	IEC, Bulletin 100-D contactor, 3 pole DC Operated, Non-reversing	
	aa = (Amp) where Amp rating can be 95, 110, 140, 180,	
	210, 250, 300, 420, 630, 860A)	
	bb = D (50/60 Hz, 120 VAC), B (60 Hz, 480 VAC), J (50/60 Hz, 24VDC)	
	cc = 00 (0 N.O. + 0 N.C.), 11 (1 N.O. + 1 N.C.)	
	22 (2 N.O. + 1/1L N.C.)	
104-Daabbcc	IEC, Bulletin 104-D contactor, 3 pole DC Operated, Reversing	
	aa = (Amp) where Amp rating can be 95, 110, 140, 180,	
	210, 250, 300, 420, 630, 860A)	
	bb = D (50/60 Hz, 120 VAC), B (60 Hz, 480 VAC), J (50/60 Hz, 24VDC)	
	cc = 24 (2 N.O. + 4 N.C.), 24L (2 N.O. + 2/2L N.C.)	
100-DSa-b	100-D/104-D Aux contacts	
	aa = 1 (Left or Right Inside Mounting)	

	2 (Left or Right Outside Mounting)	
	bb = 11 (1N.O. + 1 N.C.), L11 (1N.O. + 1L N.C.), 20 (2 N.). + 0 N.C.)	
	B11 (Electronic compatible aux contact)	
100-DFSCa	100-D Contactor Suppressor Module, RC Module	
	a = 48 (21-48V 50Hz/24V-55V 60Hz)	
	110 (95-110V 50Hz/110V-127V 60Hz)	
	240 (180-277V 50Hz/208V-277V 60Hz)	
	550 (380-550V 50Hz/440V-600V 60Hz)	
100-DFSVa	100-D Contactor Suppressor Module, Varistor Module	
	a = 55 (21-48V 50Hz/24V-55V 60Hz)	
	136 (55-136V)	
	277 (137-277V)	
	575 (278-600V)	
193a-Ebbcd	IEC E1 Solid State Overload Relay	
	a = 193 (3Ø), 193R (3Ø, Cage Clamp), 193S (1Ø)	
	bb = ED1(fixed trip Class 10), EE (Selectable Trip Class 10, 15, 20, 30)	
	c = A - G (3Ø, 0.1-0.5, 0.2-1, 1-5, 3.2-16, 5.4-27, 9-45, 19-90A),	
	P-U (1Ø, 1-5, 3.2-16, 5.4-27, 9-45, 18-90A)	
	d = B (C09..C23 contactor size), D (C30..C43 contactor size), E (C60..C85 contactor size)	
193-EPx	DIN Rail/Panel Adapter	
	x = B (for 193-ED1_B, 193EE_B), D (for 193-EE_D), E (for 193-EE_E)	
592EECT	Starter, Motor, Overloads, Solid State, Range 1.5 A - 4.5 A	
592EEDT	Starter, Motor, Overloads, Solid State, Range 3.0A - 9.0A	
592EEEC	Starter, Motor, Overloads, Solid State, Range 6.0A - 18.0A	
592EEEC	Starter, Motor, Overloads, Solid State, Range 9.0A - 27.0A	
592EEFC	Starter, Motor, Overloads, Solid State, Range 15.0A - 45.0A	
592EEGD	Starter, Motor, Overloads, Solid State, Range 30.0A - 90.0A	
193-Eaabc	E3 and E3 Plus Solid State Overload Relay-Electronic Motor Protection Relays, 3Ø or 1Ø	
	aa = C1(2 inputs, 1 output), C2 (4 inputs, 2 outputs, built-in Ground Fault)	
	b = P (0.4-2A), Z (0-5000A),	
	A-L (1-5, 3-15, 5-25, 9-45, 18-90, 28-140, 42-210, 60-302, 84-420, 125-630, 172-860A),	
	c = B (C09..C23 contactor size), D (C30..C43 contactor size), E (C60..C85 contactor size),	
	F (C95..D180 contactor size), G (D210..D420 contactor size), H (D630-D860 contactor size),	
193-ECPMx	DIN Rail/Panel Adapter for E3 and E3 Plus	
	x = 1 (for 193-EC_B, 193EE_B), 2 (for 193-EC_D), 3 (for 193-EC_E)	
193-PCT	Programming Control Terminal for E3 and E3 Plus	
193-EIMD	AC Input Interface Module for 110/120V AC control circuitry	
825-CBCT	Core Balance Ground Fault sensor	
	Accessories available for Terminal Blocks, Terminal Lugs, Terminal Covers, and Phase Barriers	
193T-ABxx	Starter, Motor, Overload Relay, Bi-metallic, Single Phase Sensitivity	
	- Range 0.6 - 1.0 Amps	
	xx = 10 (0.6 - 1.0 A), 16 (1.0-1.6 A), 24 (1.6 - 2.5 A), 40 (2.5 - 4.0 A), 60 (4.0 - 6.0 A),	
193T-ACxx	Starter, Motor, Overload Relay, Bi-metallic, Single Phase Sensitivity	
	- Range 0.6 - 1.0 Amps	
	xx = 10 (6 - 10 A), 16 (10-16 A), 24 (16 - 24 A), 30 (18-13 A), 45 (30 - 45 A)	
193TCCxx	Starter, Motor, Overload Relay, Bi-metallic, Single Phase Sensitivity	
	xx = 30 (18 - 30A), 45 (30-45A), 60 (45-60A), 75 (60-75A)	
193TDC90	Starter, Motor, Overload Relay, Bi-metallic, Single Phase Sensitivity	
	-Range 63 - 80 Amps	

193TAPM	Starter, Motor, Overload Relay, Mounting Kit For LRxD2 Type, Snap-On, DIN Rail or Screw Mount Centers	
193TCPM	Starter, Motor, Overload Relay, Mounting Kit For LRxD3 Type, Snap-On, DIN Rail or Screw Mount Centers	
	Accessories available include Anti-tamper shield, current adjustment shield, Remote Reset solenoid,	
193EC2AB	Starter, Motor, Electronic Overload For Direct Connect to 100 Contactors	
193ECPM1	Starter, Motor, DIN Rail Adapter	
193EEHF	Starter, Motor, Overload Relay, Bi-metallic, Single Phase Sensitivity	
	-Range 90 - 120 Amps	
140U-bcdefgh	Molded Case Circuit Breaker - Range 15 - 1200 Amps	
	b = H (125A), J (250A), K (400A), Q (600A), M (800A), and N (1200A)	
	c = 2 (20-29kA), 3 (30-39kA), 5 (50-59kA), 6 (60-69kA), 8 (80-89kA), and 0 (>= 100kA)	
	d = C (Fixed Thermal/Fixed Magnetic), D (Fixed Thermal/Adjust Magnetic),	
	E (Adjust Thermal/Adjust Magnetic), F (Adjust Thermal/Adjust Magnetic),	
	G (Electronic –Long, Short, Ground Fault), H (Electronic – Long, Short, High Instant),	
	I (Electronic (Long, Short, High Instant, Ground Fault), L (Electronic – Long and Short time),	
	S (Molded Case Switch – isolator)	
	e = 3 pole	
	f = C (10 rr, A), D (100 rr0, A), E (1000 rr00 A)	
	g = Internal Control Modules	
	A (1 Aux contact), B (2 Aux contacts), D (1 Alarm contact), F (1 Aux + 1 Alarm contact),	
	G (Under voltage release only), P (Shunt trip only)	
	Control Module Combinations	
	H (1 Aux + under voltage release), J (2 Aux + under voltage release),	
	L (1 Aux + 1 Alarm + under voltage release), N (1 Alarm + under voltage release),	
	Q (1 Aux + shunt trip), R (2 Aux + shunt trip), T (1 Aux + 1 Alarm + shunt trip),	
	V (1 Alarm + shunt trip)	
	h = Voltage Code description: reference Rockwell Automation documentation	
140U-G-RM12B	Molded Case Circuit Breaker, Variable-Depth Rotary Operating Mechanism, Type 1/3/3R/4/4X/12 Rotary Handle, 12 in operating rod, Black Handle	
140U-G-RM12R	Molded Case Circuit Breaker, Variable-Depth Rotary Operating Mechanism, Type 1/3/3R/4/4X/12 Rotary Handle, 12 in operating rod, Red Handle	
140U-G-PL	Padlock Kit, Padlocking Hasp, Lock-OFF only	
140-U-G-DRA2	DIN Rail Adapter, allows 2-pole G-Frame MCCB to mount to 35 mm DIN rail, 2 poles	
140-U-G-DRA3	DIN Rail Adapter, allows 2-pole G-Frame MCCB to mount to 35 mm DIN rail, 1 poles	
140U-H1C1-Caa	Molded Case Circuit Breaker, Single Pole, 25kA at 240V, 18kA at 277V	
	aa = rated current (15, 20, 25, 30, 35, 40, 45, 50, 60, 70, 80, 90)	
140U-H1C1-Daa	Molded Case Circuit Breaker, Single Pole, 25kA at 240V, 18kA at 277V	
	aa = rated current (10 = 100A, 11 = 110A, 12 = 125A)	
	Disconnects	
	ROTARY, FUSED DISCONNECT	
194R-Nxxx0P3	1Ø 115,230V - 3Ø 200,230,460,575V	

	xxx = A20 (30A, Fuse BS88A1), A30 (60A, Fuse BS88A3),	
	= C03 (30A, Fuse 30A Class CC)	
	= J03 (30A, Fuse 30A Class J), J06 (60A, Fuse 30A Class J), J10 (100A, Fuse 30A Class J)	
194R-Nxxx0P3	1Ø 230V - 3Ø 200,230,460,575V	
	xxx = H10 (100A,Fuse 100AHRCII-C), H20 (200A,Fuse 200AHRCII-C), H40 (400A,Fuse 400AHRCII-C),	
	= J20 (200A, Fuse 200A Class J), J40 (400A, Fuse 400AHRCII-C)	
	Rotary Handles	
194R-HSx	With Defeater	
	x = 1 (Black/Grey, IP42, w/ Defeater available), 4 (IP66,w/ Defeater available)	
	= 1E (Red/Yellow, IP42 w/o Defeater available), 4E (Red/Yellow, IP66 w/o Defeater available)	
194R-HMx	Standard Orientation With Defeater	
	x = 1 (Black/Grey, IP42, w/ Defeater available), 4 (IP66,w/ Defeater available)	
	= 1E (Red/Yellow, IP42 w/o Defeater available), 4E (Red/Yellow, IP66 w/o Defeater available)	
194R-HMx-N1	90 Degree Orientation With Defeater	
	x = 1 (Black/Grey, IP42, w/ Defeater available), 4 (IP66,w/ Defeater available)	
	= 1E (Red/Yellow, IP42 w/o Defeater available), 4E (Red/Yellow, IP66 w/o Defeater available)	
194R-Rx	Operating Shaft,	
	x =1 (263 mm),2 (457mm), 3 (200mm), 4 (403mm), 5 (278mm), 6 (532mm)	
194R-R1M*	Operating Shaft 263 mm, use with 194R HM** and 194R 30 A or 60 A switch	
194R-R2M*	Operating Shaft 457 mm, use with 194R HM** and 194R 30 A or 60 A switch	
	UL/CSA Disconnect Switch Kits, Fused (Non Fused available)	
194R-NxyyyP34zz	30 A, 200V, 230V, 460V, 575V, 30A Class J Fuse, Black/Grey	
	x = J (Class J Fuse), C (Class CC Fuse - only 30 A)	
	yyy = 030 (30A), 060 (60A), 100 (100A), 200 (200A), 400 (400A)	
	zz = R1 (30A or 60A, Black/Grey) or ER1 (30A or 60A, Red/Yellow)	
	= R3 (100A or 200A, Black/Grey) or ER3 (100A or 200A, Red/Yellow)	
	= R5 (400A, Black/Grey) or ER5 (400A, Red/Yellow)	
194R-HSG1	Operating Shaft Guide	
194R-R1G	Shaft Guard, Dim reference A1,A2,B1,B2	
194R-R3G	Shaft Guard, Dim reference C1,C2,D1,D2	
194R-SC1	Operating Shaft Coupler - use with 194R-R1 and 194R-R2	
194R-HAIRPIN	Cotter Pin for 194R-R1or 194R-R2 Shaft	
194R-FCA2	Fuse Cover	
194R-FCJ60	Fuse Cover	
194R-FCC1	Fuse Cover	
194R-FCC2	Fuse Cover	
194R-FCD1	Fuse Cover	
194R-FCE1	Fuse Cover	
194R-FCF1	Fuse Cover	
194R-LNCx	Terminal Shield, x = 1 - 6	
199-LE1	Terminal Lug - For 194R-NH100P3 only	
199-LF1	Terminal Lug - For 194R-NJ200P3, -NN200P3, -NA400P3	
199-LG1	Terminal Lug	
199-LH1	Terminal Lug	

194R-AA	Auxiliary Contact Adaptor	
195-GA10	Auxiliary Contact 1N.O.	
195-GA01	Auxiliary Contact 1N.C.	
195-GA11	2 pole Auxiliary Contact 1N.O./ 1N.C.	
195-GA20	2 pole Auxiliary Contact 2N.O.	
195-GA02	2 pole Auxiliary Contact 2N.C.	
194R-A1	Auxiliary support for 5…8 circuits per switch	
194R-P1	Disconnect Switch Padlocking kit	
	194RF Internal Handle with Mechanical Interlock	
194RF-aabb	194RF Internal Handle/Interlock Kit, Frame Size NFPA 79 Kit	
	aa = 30 (30 A), 60 (60A), 100 (100A), 200 (200A), 400 (400A)	
	bb = R1 (10.3” Shaft Length), R2 (18” Shaft Length), R3 (7.9” Shaft Length),	
	R5 (10.9” Shaft Length	
194RF-abcde	194RF Pre-assembled Switch with Handle and NFPA79 Internal Handle/Interlock	
	a = N (Open), F (Type 3/4/12 Painted Steel), C (Type 4/4X Stainless Steel)	
	b = C (CC Fuse 30A), J (J Fuse 30-400A), N (Non-Fused)	
	c = 30 (30 A), 60 (60A), 100 (100A), 200 (200A), 400 (400A)	
	d = R1 (10.3” Shaft Length), R2 (18” Shaft Length)	
	e = 4 (Type 4/4X, Black), 4E (Type 4/4X, Red/Yellow)	
	FUSIBLE, 250V & 600V (other options available)	
1494V-bccc-d	Variable Depth Flange Mounted Disconnect	
	b = Right Hand Mechanism:	
	DN (non-fusible), DH (Class H fuse clips), DJ (Class J fuse clips),	
	DR (Class R fuse clips)	
	Left Hand Mechanism	
	DNX (non-fusible), DHX (Class H fuse clips), DJX (Class J fuse clips,	
	DRX (Class R fuse clips)	
	ccc = Non Fusible : 30A – 600A	
	Fusible : 2xx (250V) –or- 6xx (600V)	
	x3x (30A switch), x6x (60A switch), x1x (100A switch), x2x (200A switch),	
	x4x (400A switch), x6x (600A switch),	
	xx3 (30A clips), xx6 (60A clips), xx1 (100A clips), xx2 (200A clips),	
	xx4 (400A clips), xx6 (600A clips)	
	d = Accessories (-d –d –d)	
	A (Long connecting Rod), B (Stainless Steel Handle), D (Line & Load lugs),	
	E (Protective Fuse Cover), F (1 N.O. contact), FF (2 N.O. contacts),	
	G (1N.C. contact), GG (2 N.C. contacts), H (1 N.O. and N.C. Electrical interlock),	
	HH (2 N.O. and N.C. Electrical interlock)	
	EXAMPLES:	
1494V-DR233	Disconnect, Panel, Flange, 30Amp - 250 Volt, Fused Class R	
1494V-DJ666	Disconnect, Panel, Flange, 60Amp - 600 Volt, Fused Class J	
	STANDARD SIZE ENCLOSED, CLASS H FUSE CLIPS, 3 POLE (other options available)	
1494GxF3H2420	Disconnect, Safety 250 Volt, Fused With (1NO-1NC) Contact	
	x = B (30Amp), C (60Amp), D (100Amp), E (200Amp)	
1494GxF3H6420	Disconnect, Safety 600 Volt, Fused With (1NO-1NC) Contact	

	x = B (30Amp), C (60Amp), D (100Amp), E (200Amp)	
1494GxF3N420	Disconnect, Safety 600 Volt, Fused With (1NO) Contact	
	x = B (30Amp), C (60Amp), D (100Amp), E (200Amp)	
IEC Load Switches	Base Mounted 25 … 100A	
	(Front mounted, 3 pole-2 position, 3 pole-3 position optional)	
194E-Axxx-175y	Off-On Mounted, SW (Including Operating Shaft) 25A	
	xxx = 25 (25A), 40 (40A), 63 (63A), 80 (80A), 100 (100A)	
	y = 3 (3 pole), 6 (6 pole)	
	Screw-Mounting handles (22mm Mounting for Front Mount available)	
194L-HExy-175	Off-On Base/Frt Mount, Rotary SW Operator Handle (Lockable, Red/Yellow, 25-100A)	
	x = 6 (25-100A) or 8 (40-100A)	
	y = G (Red/Yellow) or N (Black/Grey)	
IEC Load Switch Accessories	25 … 100A	
194E-x-Pyy	LoadSwitch	
	x = A (For 194E-A...), E (For 194E-E…)	
	yy = 11 (1 N.O.+1 N.C.), L11 (1 N.O.+1 N.E.L.B.), 22 (2 N.O.+2 N.C.), D10 (1 N.O.E.B.)	
194E-xyyy-NP	Additional Pole, 1 N.O.	
	x = A (For 194E-A...), E (For 194E-E…)	
	yyy = 32 (32A), 40 (40A), 63 (63A), 80 (80A), 100 (100A)	
194E-A32-P3	Earthing/Grounding Terminal	
	x = A (For 194E-A...), E (For 194E-E…)	
	yyy = 32 (25,32 A), 63 (40,63 A), 100 (80, 100A)	
194E-xyyy-TN	Neutral Terminal	
	x = A (For 194E-A...), E (For 194E-E…)	
	yyy = 32 (25,32 A), 63 (40,63 A), 100 (80, 100A)	
194E-G3660	6-Pole Mechanical Coupling - For 194E-25/32	
194E-G3661	6-Pole Mechanical Coupling - For 194E-40/63	
194E-G3662	6-Pole Mechanical Coupling - For 194E-80/100	
194E-xx-Cy	Terminal Cover, - For 194E-E...	
	xx = 32 (25,32 A), 63 (40,63 A), 100 (80, 100A)	
	y = 3 (3 poles), 4 (4 poles)	
194L-G2830	Interlock Shaft for Base Mount, 44mm, Plastic, Qty 5 (Front Mount available)	
194E-G3687	Interlock Shaft for Base Mount, 44mm, Metal, Qty 5 (Front Mount available)	
194L-G3194	Interlock Shaft for Base Mount, 52mm, Plastic, Qty 5 (Front Mount available)	
194E-G3707	Interlock Shaft for Base Mount, 52mm, Metal, Qty 5 (Front Mount available)	
194L-G3195	Interlock Shaft for Base Mount, 57mm, Plastic, Qty 5 (Front Mount available)	
194L-G3393	Metal Shaft Extension, 90mm-235mm	
194L-G3394	Metal Shaft Extension, 230mm-350mm	
IEC Load Switches	Base Mounted 125 … 315A, w/Box Lugs, w/Bolt-on Wiring	
	(Front Mounting w/Box Lugs, w/Bolt-on Wiring available)	
194E-A125-1753	Base Mounting w/Box Lugs, 3 pole, 2 position, 125A	
194E-A160-1753	Base Mounting w/Box Lugs, 3 pole, 2 position,160A	
194E-A250-1753	Base Mounting w/Box Lugs, 3 pole,2 position, 250A	
194E-A315-1754	Base Mounting w/Box Lugs, 4 pole,2 position, 315A	
194E-B250-1753	Base Mounting w/Bolt-on Wiring, 3 pole, 2 position, 250A	
194E-B315-1753	Base Mounting w/Bolt-on Wiring, 3 pole, 2 position, 315A	
194E-E160-1753	Base Mounting w/Box Lugs, 3 pole, 2 position, 160A	
194E-F160-1754	Base Mounting w/Bolt-on Wiring, 4 pole, 2 position, 160A	
194E-F250-1754	Base Mounting w/Bolt-on Wiring, 4 pole, 2 position, 250A	
194E-F315-1754	Base Mounting w/Bolt-on Wiring, 4 pole, 2 position, 315A	

	Screw-Mounting handles, Off-On Base/Frt Mount, Rotary SW Operator Handle	
194E-HE8N-175	Lockable, Red/Yellow, 125-315A, 90mmX90mm	
194E-HE13N-175	Lockable, Red/Yellow, 125-315A, 135mmX135mm	
194E-HE8G-175	Lockable, Black/Grey, 125-315A, 90mmX90mm	
194E-HE13G-175	(Lockable, Black/Grey, 125-315A, 135mmX135mm	
194E-AB-P21-160	Auxiliary Contacts - 2N.O. / 1N.C. - For use with 194E-A125-160, 194E-B125-160	
194E-AB-P21-315	Auxiliary Contacts - 2N.O. / 1N.C. - For use with 194E-A250-315, 194E-B250-315	
194E-EF-P21-160	Auxiliary Contacts - 2N.O. / 1N.C. - For use with 194E-E125-160, 194E-F125-160	
194E-EF-P21-315	Auxiliary Contacts - 2N.O. / 1N.C. - For use with 194E-E250-315, 194E-F250-315	
194E-AE160-PE	Earthing/Grounding Terminal - For 194E-A125-160, 194E-E125-160	
194E-AE315-PE	Earthing/Grounding Terminal - For 194E-A250-315, 194E-E250-315	
194E-BF160-PE	Earthing/Grounding Terminal - For 194E-B125-160, 194E-F125-160	
194E-BF250-PE	Earthing/Grounding Terminal - For 194E-B250, 194E-F250	
194E-BF315-PE	Earthing/Grounding Terminal - For 194E-B315, 194E-F315	
194E-AE160-TN	Neutral Terminal - For 194E-A125-160, 194E-E125-160	
194E-AE315-TN	Neutral Terminal - For 194E-A250-315, 194E-E250-315	
194E-BF160-TN	Neutral Terminal - For 194E-B125-160, 194E-F125-160	
194E-BF250-TN	Neutral Terminal - For 194E-B250, 194E-F250	
194E-BF315-TN	Neutral Terminal - For 194E-B315, 194E-F315	
194E-AB40	Shaft Extension - For 194E-A or 194E-B 125…315A Base Mounted Switches	
194E-AE125-C1	Terminal Cover - For 194E-A125-160 or 194E-E125-160	
194E-AE250-C1	Terminal Cover - For 194E-A250-315 or 194E-E250-315	
194E-BF125-C1	Terminal Cover - For 194E-B125-160 or 194E-F125-160	
194E-BF250-C1	Terminal Cover - For 194E-B250-315 or 194E-F250-315	
	Transformers	
1497-a-b-c-d	Control Circuit Transformer	
	a = A (63VA), B (80VA), C (130VA), D (200VA), E (250VA), F (350VA), G (500VA), H (750VA),	
	J (800VA), K (1000VA), L (1600VA), M (2000VA)	
	b = M1 (240V, 208V primary ; 120V (60Hz) secondary),	
	M2 (240V, 208V primary ; 24V (60Hz) secondary),	
	M3 (240V, 208V primary ; 24V, 120V (60Hz) secondary),	
	M4 (415V, 400V, 380V primary ; 115V, 230V (50Hz) secondary),	
	M4 (415V, 400V, 380V primary ; 24V (50Hz) secondary)	
	c = Fuse Block Options: 0 (0 primary, 0 Secondary), 1 (0 primary, 1 Secondary),	
	2 (2 primary, 0 Secondary), 3 (2 primary, 1 Secondary)	
	d = N (No Secondary Fuse, No Cover)	
1497B-a-b-c-d	Control Circuit Transformer	
	a = A1 (50VA), A2 (75VA), A3 (100VA), A4 (150VA), A5 (200VA), A6 (250VA),	
	A7 (300VA), A9 (500VA), A10 (750VA), A11 (1000VA), A12 (1500VA),	
	A13 (2000VA), A14 (3000VA)	
	b = M11 (600/575/550V primary ; 120Vx 240V (60Hz) secondary),	
	M12 (120Vx240V primary ; 120Vx240V (60Hz) secondary),	
	M13 (120Vx240V primary ; 24V (60Hz) secondary),	
	M14 (240Vx480V primary ; 120Vx240V(60Hz) secondary),	
	M15 (380/400/416V primary ; 115Vx230V (60Hz) secondary)	
	M16 (240Vx480V primary ; 24V (60Hz) secondary	
	M17 (208Vx240V primary ; 24V (60Hz) secondary)	

	c = Fuse Block Options: 0 (0 primary, 0 secondary), 1 (0 primary, 1 secondary),	
	2 (2 primary, 0 secondary), 3 (2 primary, 1 secondary)	
	d = N (No Taps)	
1497D-a-b-c-d	Control Circuit Transformer	
	a = A1 (50VA), A2 (75VA), A3 (100VA), A4 (150VA), A5 (200VA), A6 (250VA),	
	A9 (500VA), A10 (750VA), A11 (1000VA), A12 (1500VA), A13 (2000VA),	
	A14 (3000VA)	
	b = M10 (240x480V primary; 120/240V (60Hz) secondary)	
	M11 (600V primary ; 120V/240V (60Hz) secondary),	
	M14 (240Vx480V primary ; 120V/240V(50/60Hz) secondary),	
	M20 (208V primary ; 120V/240V (60Hz) secondary),	
	M21 (480V primary ; 120V/240V (60Hz) secondary,	
	M22 (480V primary ; 120V/240V (50/60Hz) secondary),	
	M23 (600V primary ; 120V/240V (50/60Hz) secondary),	
	M24 (480V primary ; 208V (60Hz) secondary),	
	c = Fuse Block Options: 0 (0 primary, 0 secondary)	
	d = 2 (two 5% taps below rated primary volts)	
	22 (2.5% taps: 2 above and 2 below rated primary volts)	
	4 (Four 2.5% taps below rated primary volts)	
	N (No Taps)	
	Power Supplies	
1606-XLE80E	XLE Essential Single Phase, 80W, 3.3A, 10A slow blow fuse or 1489-A1C100/20A, DIN RAIL; Input Voltage: 1Ø,100-120VAC, 200-240VAC; Output Voltage: 24-28VDC	
1606-XLE120E	XLE Essential Single Phase, 120W, 5.0A, 10A slow blow fuse or 1489-A1C100/20A, DIN RAIL; Input Voltage: 1Ø,100-120VAC, 200-240VAC; Output Voltage: 24-28VDC	
1606-XLE240E	XLE Essential Single Phase, 240W, 10A, 10A slow blow fuse or 1489-A1C100/20A,	
	DIN RAIL; Input Voltage: 1Ø,100-120VAC, 200-240VAC; Output Voltage: 24-28VDC	
1606-XLSDNET4	Performance, 91W, 3.8 Amp, 6A slow blow fuse or 1492-SPU1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24VDC	
1606-XLSDNET8	Performance, 192W, 8 Amp, 6A slow blow fuse or 1492-SPU1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24VDC	
1606-XLS80E	Performance, 80W, 3.4 Amp, 6A slow blow fuse or 1492-SPU1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24-28VDC	
1606-XLS120E	Performance, 120W, 5 Amp, 6A slow blow fuse or 1492-SPU1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24-28VDC	
1606-XLS240E	Performance, 240W, 10 Amp, 6A slow blow fuse or 1492-SPU1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24-28VDC	
1606-XLS480E	Performance, 480W, 20 Amp, 6A slow blow fuse or 1489-A1C060/20A;	
	Input Voltage: 1Ø,100-240VAC, 110-300VDC; Output Voltage: 24-28VDC	
1606-XLS480E-3	Performance, 480W, 20 A, 6A (*3) slow blow fuse or 1492-SP3C060;	

	Input Voltage: 3Ø, 380-480VAC, 600VDC; Output Voltage: 24-28VDC	
1606-XLB	Back of panel bracket for 1606-XLS products	
1606-XLS240-UPS	1606 Uninterruptible Power Supply, 240W, 10A, DC	
	7.5Ah or 26Ah Battery for 1606-XLS240-UPS available as accessories	
1609-U500NH	500VA (325W), 115AC, 0-50°, without Network Management Card, DIN RAIL mount	
1609-U500NH-C	500VA (325W), 115AC, 0-50°, with Network Management Card, DIN RAIL mount	
1609-U500EH	500VA (325W), 230AC, 0-50°, without Network Management Card, DIN RAIL mount	
1609-U500EH-C	500VA (325W), 230AC, 0-50°, with Network Management Card, DIN RAIL mount	
1609-P3000N	3000VA (2100W), 120AC, 0-50°, with Network Management Card	
1609-P3000A	3000VA (2100W), 230AC, 0-50°, with Network Management Card	
1609-P8000E	8000VA (6400W), 230AC, 0-50°, with Network Management Card	
1607-XT50D1A	ArmorPower 100…240V AC, 100…353V DC, 48 W, 2A, <25A inrush	
1607-XT100D1A	ArmorPower 100…240V AC, 100…353V DC, 91.2 W, 3.8A, <25A inrush	
	Terminal Blocks	
1492-Jxy	Feed Through Terminal Block	
	x = 3 (24A), 4 (32A), 6 (41A) for IEC 800V AC/DC,	
	x = 10 (57A), 16(76A), 35 (125A), 50 (150A), 70 (192A) for IEC 1000V AC/DC	
	y = BLANK (grey), -RE (red), - B (blue), -BL (black), -G (green), -Y (yellow), OR (orange), -BR (brown), -W (white)	
1492-JG2Q	Feed Through Grounding Block with 2 connection on each side, 1.5mm^2	
1492-JG3	Feed Through Grounding Block, 2.5mm^2	
1492-JG3TW	Feed Through Grounding Block with 2 connection on each side, 2.5mm^2	
1492-JGx	Feed Through Grounding Block, x=4,6,10,16,35,50,70 (xmm^2)	
1492-JDG3	2 Circuit with one feed through and one ground, Grounding Block, 2.5mm^2	
1492-JDG3C	2 Circuit commoned Grounding Block, 2.5mm^2	
1492-JKD3	Knife Disconnect Feed Through Isolation Block, Grey, IEC 500V AC/DC, 24A	
1492-JKD3TP	Knife Disconnect Feed Through Isolation Block with test plug, Grey, IEC 500V AC/DC, 24A	
199-DR1	Steel Mounting Rails (available in Aluminum, Hi-rise Sym Steel, and Hi-rise Sym Aluminum)	
1492-EBJxy	End Barrier, x = 3 or 16 (For 1492-J16, -J35)	
	y = BLANK (grey), B (blue), Y (yellow)	
1492-ERL35	Screwless End Retainer - For 1492-J3,-J4,-J6,-J10, grounding blocks	
1492-EAJ35	End Anchor, DIN - Normal Duty- For 1492-J3,-J4,-J6,-J10, grounding blocks	
1492-EAHJ35	End Anchor, DIN - Heavy Duty, grounding blocks	
1492-CJJ5-n	Screw Center jumper for 24A. Replace n with number of poles: 10, 4, 3, or 2	
1492-CJJ6-n	Screw Center jumper for 32A. Replace n with number of poles: 10, 4, 3, or 2	
1492-CJJ8-n	Screw Center jumper for 41A. Replace n with number of poles: 10, 4, 3, or 2	
1492-CJJ10-n	Screw Center jumper for 57A. Replace n with number of poles: 10, 4, 3, or 2	
1492-CJJ12-n	Screw Center jumper for 76A. Replace n with number of poles: 10, 4, 3, or 2	
1492-CJJ16-n	Screw Center jumper for 125A. Replace n with number of poles: 10, 4, 3, or 2	

1492-CJJ18-n	Screw Center jumper for 150A. Replace n with number of poles: 4, 3, or 2	
1492-CJJ20-n	Screw Center jumper for 192A. Replace n with number of poles: 4, 3, or 2	
1492-CJLJ5-n	Plug-in Center jumper for 24A. Replace n with number of poles: 50, 10, 9, 8, 7, 6, 5, 4, 3, or 2	
1492-CJLJ6-n	Plug-in Center jumper for 32A. Replace n with number of poles: 41, 10, 4, 3, 2	
1492-SJ5B-n	Insulated Side jumper for 24A. Replace n with number of poles: 24 or 10	
1492-T1	Screw Type Jumper Notching Tool	
1492-EBJ16	Partition Plate - For 1492-J3,-J4,-J6,-J10	
1492-PPJD3	Partition Plate - For 1492-J16,-J35	
1492-TPS23	Test Plug Socket - For 1492-J3	
1492-TPS23L	Test Plug Socket - For 1492-J4,-J6,-J10	
1492-TPS4L	Test Plug Socket - For 1492-J16,-J35	
1492-TPaa	Test Plug –	
	aa = 23 (For 1492-J3,-J4,-J6,-J10) -or- 40 (For 1492-J16,-J35)	
1492-EWPJ5	Electrical Warning Plate - For 1492-J3, -J4	
1492-EWPJ8	Electrical Warning Plate - For 1492-J6, -J10	
1492-EWPJ12	Electrical Warning Plate - For 1492-J16, -J35	
1492-EWPJ18	Electrical Warning Plate - For 1492-J50, -J70	
1492-Lxy	Feed Through Terminal Block, GREY, for IEC 800V AC/DC	
	x=2 (17.5A, IEC 500VAC), 3 (24A), 4 (32A), 6 (41A),10 (57A), 16(76A), 35 (125A)	
	y = BLANK (grey), -RE (red), - B (blue), -BL (black), -G (green), -Y (yellow), OR (orange), -BR (brown), -W (white)	
1492-LGx	Feed Through Grounding Block, x= 2 (1.5mm^2), 3 (2.5mm^2), 4 (4mm^2), 6 (6mm^2),	
	10 (10mm^2), 16 (16mm^2), 35 (35mm^2)	
1492-LDG2	2 Circuit with one feed through and one ground, Grounding Block, 1.5mm^2	
1492-LDG3	2 Circuit with one feed through and one ground, Grounding Block, 2.5mm^2	
1492-LDG4	2 Circuit with one feed through and one ground, Grounding Block, 4mm^2	
199-DR1	Steel Mounting Rails (available in Aluminum, Hi-rise Sym Steel, and Hi-rise Sym Aluminum)	
1492-EBLx	End Barrier, Grey, x=2,3,4,6,10,16	
1492-EBLx-B	End Barrier, Blue, x=2,3,4,6,10,16	
1492-EBLx-Y	End Barrier, Yellow, x=2,3,4,6,10,16	
1492-ERL35	Screwless End Retainer	
1492-EAJ35	End Anchor, DIN - Normal Duty	
1492-EAHJ35	End Anchor, DIN - Heavy Duty	
1492-CJL4-n	Plug-In center jumper 1492-L2. Replace n with number of poles: 10, 5, 4, 3, or 2	
1492-CJK5-n	Plug-In center jumper 1492-L3. Replace n w/ number of poles: 50, 10, 9, 8, 7, 6, 5, 4, 3, or 2	
1492-CJK6-n	Plug-In center jumper 1492-L4. Replace n with number of poles: 10, 9, 8, 7, 6, 5, 4, 3, or 2	
1492-CJK8-n	Plug-In center jumper 1492-L6. Replace n with number of poles: 32, 4, 3, or 2	
1492-CJKL12-2	Plug-In center jumper 1492-L16	
1492-CJKL16-2	Plug-In center jumper 1492-L35	
1492-TPL4	Test Plug - For 1492-L2	
1492-TPL5	Test Plug - For 1492-L3	
1492-TP23	Test Plug - For 1492-L4, -L10, -L16, -L35	
1492-TPL6	Test Plug - For 1492-L4	

1492-TPL8	Test Plug - For 1492-L6	
1492-EWPL4	Electrical Warning Plate - For 1492-L2	
1492-EWPL5	Electrical Warning Plate - For 1492-L3	
1492-EWPL6	Electrical Warning Plate - For 1492-L4	
1492-EWPL8	Electrical Warning Plate - For 1492-L6	
1492-EWPL10	Electrical Warning Plate - For 1492-L10	
1492-EWPL12	Electrical Warning Plate - For 1492-L16	
1492-EWPL16	Electrical Warning Plate - For 1492-L35	
1492-GM35	Group Marking Carrier	
1492-M3X12	Snap in Marker Card - For 1492-L2	
1492-M5X10	Snap in Marker Card - For 1492-L3	
1492-M6X10	Snap in Marker Card - For 1492-L4	
1492-M6X12	Snap in Marker Card - For 1492-L6, -L10	
1492-M7X12	Snap in Marker Card - For 1492-L16, -L35	
1492-xxx	Screw Connection Terminal Block, IEC 500V AC/DC	
	xxx = WM3 (24 A), WM4 (32 A), WMD1 (17.5 A)	
	y = BLANK (grey), -RE (red), - B (blue), -BL (black), -G (green), -Y (yellow), OR (orange),	
	-BR (brown), -W (white)	
1492-DR3	Mounting Rails	
1492-EBM3	End Barrier -For 1492-WM3…	
1492-EBM4	End Barrier -For 1492-WM4…	
1492-EBMD1	End Barrier -For 1492-WMD1…	
1492-ERL15	End Anchor	
1492-EAJ15	Mini DIN Anchor	
1492-SJM5-10	10-pole side jumper-For 1492-WM3…	
1492-N42	2-pole side jumper -For 1492-WM4…	
1492-SJ6-10	10-pole side jumper -For 1492-WM4…	
1492-SJMD5-12	12-pole insulated side jumper -For 1492-WMD1…	
1492-CJM5-n	Center jumper -For 1492-WM3…. Replace n with numer of poles: 10, 3, or 2	
1492-CJD6-n	Center jumper-For 1492-WM4…. Replace n with numer of poles: 50, 10, 5, 4, 3, or 2	
1492-PPM3	Partition Plate -For 1492-WM3… or -For 1492-WM4…	
1492-PPMD1	Partition Plate -For 1492-WMD1…	
1492-MS5X5	Snap in Marker Card -For 1492-WM3… and -For 1492-WMD1…	
1492-MS6X9	Snap in Marker Card -For 1492-WM4…	
1492-MP5*	Individual Marker Tab -For 1492-WM3… and -For 1492-WMD1…	
	* Contact Rockwell Automation for assistance	
1492-MP*	Individual Marker Tab: * please contact Rockwell Automation for assistance	
1492-WMG3	Single-circuit Mini grounding terminal block: Metallic	
1492-WMG4	Single-circuit Mini grounding terminal block: Green/Yellow	
1491R125	Block, Fuse, Class R, 2 Pole, 600 Volt, 30Amp	
1491R125	Block, Fuse, Class R, 3 Pole, 600 Volt, 30Amp	
1491R126	Block, Fuse, Class R, 3 Pole, 600 Volt, 30Amp	
1491N333	Block, Fuse, Class J, 3 Pole, 61-100Amp	
1491N521	Block, Fuse, Class J, 3 Pole, 600 Volt, 201-400Amp	
1492-PD3C111	Power Terminal Block, 3 Pole, 150 A, Copper Connectors	
	Line wire range: 1/0 - #16 , Lines per Pole: 1	
	Load wire range:: #4 - #14, Lines per Pole: 4	
1492-PD3C141	Power Terminal Block, 3 Pole, 175 A, Copper Connectors	
	Line wire range: 2/0 - #14 , Lines per Pole: 1	
	Load wire range:: #4 - #14, Lines per Pole: 4	
1492-PD3C112	Power Terminal Block, 3 Pole, 255 A, Copper Connectors	
	Line wire range: 250 MCM - #6 , Lines per Pole: 1	
	Load wire range:: 250 MCM - #6, Lines per Pole: 1	

1492-PD3C263	Power Terminal Block, 3 Pole, 350 A, Copper Connectors	
	Line wire range: 2/0 - #14 , Lines per Pole: 2	
	Load wire range:: #4 - #14, Lines per Pole: 6	
1492-PD3C163	Power Terminal Block, 3 Pole, 380 A, Copper Connectors	
	Line wire range: 500 MCM - #4 , Lines per Pole: 1	
	Load wire range:: #2 - #14, Lines per Pole: 6	
1492-PD3C2127	Power Terminal Block, 3 Pole, 760 A, Copper Connectors	
	Line wire range: 500 MCM - #4 , Lines per Pole: 2	
	Load wire range:: #2 - #14, Lines per Pole: 12	
1492-PD3C287	Power Terminal Block, 3 Pole, 760 A, Copper Connectors	
	Line wire range: 500 MCM - #4 , Lines per Pole: 2	
	Load wire range:: #4 - #14, Lines per Pole: 8	
1492-PDE1ab	Enclosed Power Terminal Block, 1 pole, Amps (Cu Wire) 75°	
	a = blank (aluminum terminals) -or- C (copper terminals)	
	b = 111 (175A, Line conductor 0.38” dia, Load 0.38” dia)	
	141 (175A, Line conductor 0.38” dia, Load 0.38” dia)	
	225 (510A, Line conductor 0.72” dia, Load 0.72” dia)	
	183 (335A, Line conductor 0.94” dia, Load 0.50” dia)	
	183 (335A, For copper Line conductor 0.72” dia, Load 0.50” dia)	
1492-PDECa	Enclosed Power Terminal Block corresponding hole plug	
	a = 1 (1492-PDE1111 or –PDE1C111, Line and Load)	
	1 (1492-PDE1141 or –PDE1C141, Line)	
	2 (1492-PDE1141 Load)	
	2 (1492-PDE1182 or –PDE1C183 Load)	
	3 (1492-PDE1225 or –PDE1C25, Line and Load)	
	3 (1492-PDE1C183, Line)	
	4 (1492-PDE1183 Line)	
1492-SM5X10	Enclosed Power Terminal Block Markers, 100 makers/card, 5 cards	
1492-PDL3111	Enclosed Power Distribution Blocks, Line AWG = 2/0-6Cu, Load AWG = 2/0-6Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
1492-PDL3141	Enclosed Power Distribution Blocks, Line AWG = 2/0-6Cu, Load AWG = 4-14Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
1492-PDL3161	Enclosed Power Distribution Blocks, Line AWG = 2/0-6Cu, Load AWG = 4-14Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
1492-PDL31S1	Enclosed Power Distribution Blocks, Line AWG = 2/0-6Cu, Load AWG = 2/0-6Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
1492-PDL3163	Enclosed Power Distribution Blocks,	
	Line AWG = 400-3/0Cu, Load AWG = 2-8Cu,	
	Over Current Max Amp Fuse: Class J 400A, Class RK1 = 400A, Class RK5 = 200A	
	Line AWG = 2/0-2Cu, Load AWG = 2-14Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
1492-PDL3194	Enclosed Power Distribution Blocks,	
	Line AWG = 600-3/0Cu, Load AWG = 1/0-8Cu,	
	Over Current Max Amp Fuse: Class J 600A, Class RK1 = 400A, Class RK5 = 200A	
	Line AWG = 2/0-2Cu, Load AWG = 2-14Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	

1492-PDL31124	Enclosed Power Distribution Blocks,	
	Line AWG = 600-3/0Cu, Load AWG = 4-8Cu,	
	Over Current Max Amp Fuse: Class J 600A, Class RK1 = 400A, Class RK5 = 200A	
	Line AWG = 2/0-2Cu, Load AWG = 4-14Cu,	
	Over Current Max Amp Fuse: Class J 200A, Class RK1 = 200A, Class RK5 = 100A	
	Connection Systems	
889N-abc-*F	16 AWG, STOOW PVC cordset	
	a = F (straight Female), R (Right Female), U (straight Male), V (Right Male)	
	b = 2 (2-Pin, 600V 13A), 3 (3-Pin, 600V 13A), 4 (4-Pin, 600V 10A),	
	5 (5-Pin, 600V 8A), 6 (6-Pin, 600V 8A)	
	c = For 2-Pin and 3-Pin:	
	AFC (Color Code A-US), AFA (Color Code B-Auto),	
	For 4-Pin and 5-Pin:	
	AFC (Color Code A-US), AFA (Color Code B-Auto), AF (Color Code C-IEC),	
	For 6-Pin:	
	AFC (Color Code C-IEC), AF (Color Code A-US)	
	* = 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F2AFC-6F (cordset, straight Female, 2-Pin, Color Code-US, 6ft cable)	
889N-ab-*F	16 AWG, STOOW PVC patchcord	
	a = FbAFNU (straight Female, straight Male), FbAFNV (straight Female, Right Male),	
	RbAFNU (right female, straight Male), RbAFNV (Right Female, Right Male)	
	b = 2 (2-Pin, 600V 13A), 3 (3-Pin, 600V 13A), 4 (4-Pin, 600V 10A),	
	5 (5-Pin, 600V 8A), 6 (6-Pin, 600V 8A)	
	* = 3 (3ft), 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F2FNU-6F (patchcord, straight Female, straight male, 2-Pin, 6ft cable)	
889N-abc-*F	18 AWG, PVC cordset	
	a = F (straight Female), R (Right Female), U (straight Male), V (Right Male)	
	b = 2 (2-Pin, 300V 10A), 3 (3-Pin, 300V 10A), 4 (4-Pin, 300V 7A),	
	5 (5-Pin, 300V 5.6A), 6 (6-Pin, 300V 5.6A)	
	c = For 2-Pin and 3-Pin:	
	AEC (Color Code A-US), AEA (Color Code B-Auto),	
	For 4-Pin and 5-Pin:	
	AEC (Color Code A-US), AEA (Color Code B-Auto), AE (Color Code C-IEC),	
	For 6-Pin:	
	AE (Color Code A-US)	
	* = 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F2AFE-6F (cordset, straight Female, 2-Pin, Color Code-US, 6ft cable)	
889N-ab-*F	18 AWG, PVC patchcord	
	a = FbAENU (straight Female, straight Male), FbAENV (straight Female, Right Male),	
	RbAENU (right female, straight Male), RbAENV (Right Female, Right Male)	
	b = 2 (2-Pin, 300V 10A), 3 (3-Pin, 300V 10A), 4 (4-Pin, 300V 7A),	
	5 (5-Pin, 300V 5.6A), 6 (6-Pin, 300V 5.6A)	
	* = 3 (3ft), 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F2FNU-6F (patchcord, straight Female, straight male, 2-Pin, 6ft cable)	

889N-abHFC-*F	16 AWG, ToughLink (TPE) cordset, Color Code A-US	
	a = F (straight Female), R (Right Female), U (straight Male), V (Right Male)	
	b = 3 (3-Pin, 600V 13A), 4 (4-Pin, 600V 10A),	
	5 (5-Pin, 600V 8A)	
	* = 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F3HVC-6F (TPE cordset, straight Female, 3-Pin, Color Code-US, 6ft)	
889N-ab-*F	16 AWG, ToughLink (TPE) patchcord	
	a = FbHFNU (straight Female, straight Male), FbHFNV (straight Female, Right Male),	
	RbHFNU (right female, straight Male), RbHFNV (Right Female, Right Male)	
	b = 3 (3-Pin, 600V 13A), 4 (4-Pin, 600V 10A), 5 (5-Pin, 600V 8A)	
	* = 3 (3ft), 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F3HFNU-6F (patchcord, straight Female, straight male, 3-Pin, 6ft cable length)	
889N-abHJA-*F	18 AWG, ToughLink (TPE) cordset, Color Code B-AUTO	
	a = F (straight Female), R (Right Female), U (straight Male), V (Right Male)	
	b = 3 (3-Pin, 300V 10A), 4 (4-Pin, 300V 7A), 5 (5-Pin, 300V 5.6A)	
	* = 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F3HJA-6F (TPE cordset, straight Female, 3-Pin, Color Code-AUTO, 6ft)	
889N-ab-*F	18 AWG, ToughLink (TPE) patchcord	
	a = FbHJNU (straight Female, straight Male), FbHJNV (straight Female, Right Male),	
	RbHJNU (right female, straight Male), RbHJNV (Right Female, Right Male)	
	b = 3 (3-Pin, 300V 10A), 4 (4-Pin, 300V 7A), 5 (5-Pin, 300V 5.6A)	
	* = 3 (3ft), 6 (6ft), 12 (12ft), 20 (20ft)	
	example 889N-F3HJNU-6F (patchcord, straight Female, straight male, 3-Pin, 6ft cable length)	
888N-ab-cF	16 AWG Receptacles, 1/2 in 14 NPT, External Threads	
	a = F (straight Female), R (Right Female), M (straight Male), E (Right Male)	
	b = 2AF1 (2-pin, Color Code A-US, 600VAC/DC, 13A),	
	3AF1 (3-pin, Color Code A-US, 600VAC/DC, 13A),	
	3AFA1 (3-PIN, Color Code B-AUTO, 600VAC/DC, 13A),	
	4AF1 (4-PIN, Color Code A-US, 600VAC/DC, 10A),	
	4AFA1 (4-PIN, Color Code B-AUTO, 600VAC/DC, 10A),	
	4AFE1 (4-PIN, Color Code C-IEC, 600VAC/DC, 8A),	
	5AF1 (5-PIN, Color Code A-US, 600VAC/DC, 10A),	
	5AFA1 (5-PIN, Color Code B-AUTO, 600VAC/DC, 10A),	
	5AFE1 (5-PIN, Color Code C-IEC, 600VAC/DC, 10A),	
	6AF1 (6-PIN, Color Code A-US, 600VAC/DC, 10A)	
	c = 1 or 3 (1ft or 3ft)	
888N-ab-cF	18 AWG Receptacles, 1/2 in 14 NPT, External Threads	
	a = F (straight Female), R (Right Female), M (straight Male), E (Right Male)	
	b = 2AE1 (2-pin, Color Code A-US, 300VAC/DC, 10A),	
	3AE1 (3-pin, Color Code A-US, 300VAC/DC, 10A),	
	3AEA1 (3-PIN, Color Code B-AUTO, 300VAC/DC, 10A),	
	4AE1 (4-PIN, Color Code A-US, 300VAC/DC, 7A),	
	4AEA1 (4-PIN, Color Code B-AUTO, 300VAC/DC, 7A),	
	4AEE1 (4-PIN, Color Code C-IEC, 300VAC/DC, 5.6A),	
	5AE1 (5-PIN, Color Code A-US, 300VAC/DC, 5.6A),	
	5AEA1 (5-PIN, Color Code B-AUTO, 300VAC/DC, 5.6A),	

	5AEE1 (5-PIN, Color Code C-IEC, 300VAC/DC, 5.6A),	
	6AE1 (6-PIN, Color Code A-US, 300VAC/DC, 5.6A),	
	c = 1 or 3 (1ft or 3ft)	
889N-L3AFA-*F	LED Cordset, 3-Pin, 18 AWG, 300V, 6A, Color Code A, * = 6 (6ft), 12 (12ft), 20 (20ft)	
889N-F4AD-C5F	Coiled Cordset, 4-Pin, 18 AWG, 300V, 5A, Color Code A	
889N-33PB-N4KF	Mini T-Port, 300V, 8A, 3-Pin	
889N-43PB-N4KF	Mini T-Port, 300V, 8A, 4-Pin	
889N-P1N5-MN5KF	Mini T-Port, 300V, 8A, 5-Pin	
889A-NADPT	mating components & accessories	
889A-U1NUT-10	Mounting nuts for 1/2" - 14 NPT threaded receptacles (qty 10)	
889A-U1FSL-10	Flat sealing washers for 1/2" - 14 NPT threaded receptacles (qty 10)	
889D-abc-d	DC Micro cordset, Color Code A	
	a = F (straight Female), R (Right Female), M (straight Male), E (Right Male)	
	b = 4 (4-Pin), 5 (5-Pin)	
	c = UC (PUR - Powertrain: good oil and chemical resistance, 22AWG, 250V, 4A),	
	HJ (TPE: good oil, chemical, and weld slag resistance, 4-Pin only, 18AWG, 250V, 4A),	
	HL (TPE, 4-Pin only, 22AWG, 250V, 4A)	
	d = 2, 5 or 10 (2m, 5m, or 10m)	
889D-abc-d	DC Micro patchcord	
	a = FbcDM (straight Female, straight Male), FbcDE (straight Female, Right Male),	
	RbcDM (right female, straight Male), RbcDE (Right Female, Right Male)	
	b = 4 (4-Pin), 5 (5-Pin)	
	c = UC (PUR - Powertrain: good oil and chemical resistance, 22AWG, 250V, 4A),	
	HJ (TPE: good oil, chemical, and weld slag resistance, 4-Pin only, 18AWG, 250V, 4A),	
	HL (TPE, 4-Pin only, 22AWG, 250V, 4A)	
	d = 2, 5 or 10 (2m, 5m, or 10m)	
889D-a4HC-d	DC Micro cordset, ToughLink, Color Code A, 4-Pin, 22AWG, 250V, 3A	
	a = F (straight Female), R (Right Female), M (straight Male), E (Right Male)	
	d = 1, 2, 5 or 10 (1m, 2m, 5m, or 10m)	
889D-a-b	DC Micro ToughLink patchcord	
	a = F4HCDM (straight Female, straight Male), F4HCDE (straight Female, Right Male),	
	R4HCDM (right female, straight Male), R4HCDE (Right Female, Right Male)	
	d = 1, 2, 3, 4, 5 or 6 (1m, 2m, 3m, 4m, 5m, or 6m)	
888D-abACc-d	DC Micro 22 AWG receptacles	
	a = F (female) or M (Male)	
	b = 3 (3-pin), 4 (4-pin), 5 (5-pin), 6 (6-pin)	
	d = 0M3 (0.3m) or 1 (1m)	
888D-abAEc-d	DC Micro 18 AWG receptacles	
	a = F (female) or M (Male)	
	b = 4 (4-pin), 5 (5-pin)	
	d = 0M5 (0.5m) or 1 (1m)	
889D-B4AC-a	LED cordset, 4-Pin, 22 AWG, 250V, 4A, Color Code A, PNP Straight Female	
	a = 2, 5, or 10 (2m, 5m, or 10m)	
889D-F4AD-C5F	Coiled Cordset, 4-Pin, 20 AWG, 250V, 4A, Color Code B, Straight Female	
889P-abc-d	Pico snap-on cordset, Color Code A, 24 AWG	

	a = S (straight Female), Z (Right Female), W (3-pin LED PNP), Y (3-pin LED NPN)	
	b = 3 (3-Pin), 4 (4-Pin)	
	c = AB (3 or 4-pin, 60VAC, 75VDC, 4A, Yellow PVC: not for 3-pin LED),	
	UB (3 or 4-pin, 60VAC, 75VDC, 4A, Yellow PUR: not for 3-pin LED),	
	AB (3-pin LED, 10-30VDC, 4A, Yellow PVR),	
	UB (3-pin LED, 10-30VDC, 4A, Yellow PUR),	
	d = 2, 5 or 10 (2m, 5m, or 10m)	
889P-abc-d	Pico screw-on cordset, Color Code A, 24 AWG	
	a = F (straight Female: not available in 3-pin LED), R (Right Female),	
	M (straight Male: Not available in 3-pin PUR or 3-pin LED),	
	E (Right Male: Not available in 3-pin PUR or 3-pin LED)	
	b = 3 (3-Pin), 4 (4-Pin)	
	c = AB (3 or 4-pin, 60VAC, 75VDC, 4A, Yellow PVC: not for 3-pin LED),	
	UB (3 or 4-pin, 60VAC, 75VDC, 4A, Yellow PUR: not for 3-pin LED),	
	AB (3-pin LED, 10-30VDC, 4A, Yellow PVR),	
	UB (3-pin LED, 10-30VDC, 4A, Yellow PUR),	
	d = 2, 5 or 10 (2m, 5m, or 10m)	
889P-abcPd-e	Pico screw-on patchcord, Color Code A, 24 AWG, 60VAC / 75VDC, 3A, QD	
	a = F (straight Female), R (Right Female)	
	b = 3 (3-Pin), 4 (4-pin)	
	c = AB (yellow PVC),	
	UB (yellow PUR),	
	d = M (straight male), M3 (4-pin straight female to 3-pin straight male), E (right male)	
	e = 1, 2, 3, 5 or 10 (1m, 2m, 3m, 5m, or 10m)	
	NOTE: limited offerings, please check with Rockwell Automation documentation	
888P-abAB4-c	Receptacles, 24AWG, 60VAC / 75 VDC, 4A, Color Code A	
	a = F (female) or M (male)	
	b = 3 (3-pin) or 4 (4-pin)	
	c = 0M3 (0.3m) or 1 (1m)	
898P-32YY-aM4	Splitters, Pico-Pico, DC Micro-Pico, 60VAC / 75VDC, 4A	
	a = P (standard wiring Pico-Pico), D (standard wiring Pico-DC Micro	
879PZ-a3bDM4-*	V-Cables, 24 AWG, Pico-DC Micro, 3-pin	
	a = F (Straight Female) or R (Right Female)	
	b = AB (PVC jacket), UB (PUR jacket)	
	* = 0M3 (0.3m), 1 (1m), 2 (2m), 5 (5m), or 10 (10m)	
879PZ-F4ABDM4-*	V-Cables, 24 AWG, Pico-DC Micro, 4-pin straight female, PVC	
	* = 0M3 (0.3m), 1 (1m), 2 (2m), 5 (5m), or 10 (10m)	
879PZ-a3bDM4-*	V-Cables, 24 AWG, Pico-DC Micro, 3-pin LED right female,	
	a = N (right Female, PNP) or N (right Female, NPN)	
	b = AB (PVC jacket), UB (PUR jacket)	
	* = 0M3 (0.3m), 1 (1m), 2 (2m), 5 (5m), or 10 (10m)	
889V-abc-*	DIN Valve cordsets – Valve A (18mm), 2-pole + dual ground	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	c = DBE (18AWG Black PVC, Brown, Blue, Green/Yellow)	
	DRD (20AWG Black PUR, Brown, Blue, Green/Yellow)	
	* = 2 (2 m), 5 (5m), 10 (10m)	
889V-RZ3ab-*	DIN Valve cordsets – Valve A (18mm), 3-pole + ground, 0-250VAC	
	Wiring: ground away from cable exit	
	a = G (Orientation: Ground away from cable exit)	
	A (Orientation: Ground towards cable exit)	

	c = BE (18AWG Black PVC, Brown, Blue, Green/Yellow)	
	RD (20AWG Black PUR, Brown, Blue, Green/Yellow)	
	* = 2 (2 m), 5 (5m), 10 (10m)	
889V-abc-T	DIN Valve Field Attachable – Valve A (18mm), Screw-type, 2-pole + ground	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	c = GCF (PG9 Cable Grip / Thread Size)	
	GFF (PG11 Cable Grip / Thread Size)	
	GNF (1/2”-NPT Cable Grip / Thread Size)	
889V-RZ3a-T	DIN Valve Field Attachable – Valve A (18mm), Screw-type, 3-pole + ground, Straight Wired, 0-250 VAC/DC	
	a = GCF (PG9 Cable Grip / Thread Size)	
	GFF (PG11 Cable Grip / Thread Size)	
	GNF (1/2”-NPT Cable Grip / Thread Size)	
889W-abc-*	DIN Valve cordsets – Valve B (11mm), 2-pole + ground	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	c = GBE (18AWG Black PVC, Brown, Blue, Green/Yellow: Grnd away from cable exit)	
	ABE (18AWG Black PVC, Brown, Blue, Green/Yellow: Grnd towards cable exit)	
	GRD (20AWG Black PUR, Brown, Blue, Green/Yellow: Grnd away from cable exit)	
	ARD (20AWG Black PUR, Brown, Blue, Green/Yellow: Grnd towards cable exit)	
	* = 2 (2 m), 5 (5m), 10 (10m)	
889W-abc-*	DIN Valve Field Attachable – Valve B (11mm), Screw-type, 2-pole + ground	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	C2 (230VAC/DC: LED & Varistor) – only for LED & Varistor option	
	c = GDF (PG7 Cable Grip / Thread Size)	
	GCF (PG9 Cable Grip / Thread Size)	
	GNF (1/2”-NPT Cable Grip / Thread Size) – only for Straight Wired option	
889Y-abc-*	DIN Valve Field Attachable – Valve BEU (10mm), Screw-type, 2-pole + ground	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	C2 (230VAC/DC: LED & Varistor) – only for LED & Varistor option	
	c = GDF (PG7 Cable Grip / Thread Size)	
	GCF (PG9 Cable Grip / Thread Size)	
	GNF (1/2”-NPT Cable Grip / Thread Size) – only for Straight Wired option	
889W-abc-*	DIN Valve cordsets – Valve C (18mm), 2-pole + ground	

	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	c = DBD (20AWG Black PVC, Brown, Blue, Green/Yellow)	
	DRD (20AWG Black PUR, Brown, Blue, Green/Yellow)	
	* = 2 (2 m), 5 (5m), 10 (10m)	
889Z-abGDE-T	DIN Valve Field Attachable – Valve C (9.4mm), Screw-type, 2-pole + ground, PG7 Cable Grip / Thread Size	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
889Z-RZ3GDE-T	DIN Valve Field Attachable – Valve C (9.4mm), Screw-type, Straight Wired, 3-pole + ground, PG7 Cable Grip / Thread Size, 250VAC / 300VDC	
889S-abGDE-T	DIN Valve Field Attachable – Valve C (9.4mm), Screw-type, 2-pole + ground, PG7 Cable Grip / Thread Size	
	a = R (Straight Wired)	
	L (LED & Varistor Surge Suppression)	
	b = Z2 (0-250VAC/DC: Straight Wired)	
	D2 (24VAC/DC: LED & Varistor)	
	A2 (115VAC/DC: LED & Varistor)	
	C2 (230VAC/DC)	
889S-RZ3GDE-T	DIN Valve Field Attachable – Valve C (9.4mm), Screw-type, Straight Wired, 3-pole + ground, PG7 Cable Grip / Thread Size, 250VAC / 300VDC	
898D-aPT-b	DC Micro Style distribution box, 4-pin, 10-30VDC, 3A, one signal per port	
	a = 54 (4 port, no LED), P54 (4 port with LED), 56 (6 port, no LED), P56 (6 port with LED),	
	58 (8 port, no LED), 58PT (8 port with LED)	
	b = N7 (with 4 port box), N9 (with 6 port box), N12 (with 8 port box)	
889D-F4ACDM-a	Device patchcord, a = 1,2,3,5, or 10 (cable length in meters)	
889N-FaAF-b	Main cordset-straight to conductor	
	a = replace a with number of pins in the main conductor	
	b = replace b with the length of cable in meters	
1485A-M12	Sealing caps	
871A-TS4-PM	Field Attachable connectors	
889P-M4DC-H	IDC Feld Attachable Connectors	
898D-aDT-Bb	DC Micro Style distribution box, 4-pin, 10-30VDC, 3A, two signals per port	
	a = 54 (4 port, no LED), P54 (4 port with LED), 58 (8 port, no LED), P58 (8 port with LED),	
	b = 5 (5m cable) or 10 (10m cable)	
889D-F4ACDM-a	Device patchcord, a = 1,2,3,5, or 10 (cable length in meters)	
879N-F4ACDM-a	Device V-cables (straight)	
	a = replace a with the length of cable in meters	
1485A-M12	Sealing caps	
871A-TS4-DM	Field Attachable connectors	
889P-M4DC-H	IDC Feld Attachable Connectors	
898D-aPT-T	DC Micro Style terminal block distribution box, 4-pin, 10-30VDC, 2A/channel, one signal/port	
	a = 54 (4 port, no LED), P54 (4 port PNP LED), 58 (8 port, no LED), P58 (8 port PNP LED)	
	b = 5 (5m cable) or 10 (10m cable)	

889D-F4ACDM-a	Device patchcord, a = 1,2,3,5, or 10 (cable length in meters)	
1485A-M12	Sealing caps	
871A-TS4-DM	Field Attachable connectors	
889P-M4DC-H	IDC Feld Attachable Connectors	
898P-PaPT-Bb	Pico, 3-pin cable connector distribution box, PNP LED, 10-30VDC, 2A per channel/6A total	
	a = 34 (4 port), 36 (6 port), 38 (8 port), 310 (10 port), 312 (12 port)	
	b = 5 (5m cable) or 10 (10m cable)	
1485A-M12	Sealing Caps for Pico Style 3-pin cable distribution box	
889P-F3UBPM-a	Device PUR patchcord, 3-pin, a = 1,2,3,5, or 10 (cable length in meters)	
871A-TS3-PM	Field Attachable connectors	
889P-M3DC-H	IDC Feld Attachable Connectors	
1492-MS9X20	Labels	
889D-R8AB-a	Device PUR cordset, 8-pin, Right Female	
898P-PaPT-D8	Pico Style DC Micro distribution box, PNP LED, 10-30VDC, 2A per channel/6A total, 8-pin QD	
	a = 34 (4 port), 36 (6 port)	
889A-PMCAP	Sealing Caps for Pico Style DC Micro distribution box	
889D-R8ABDM-a	DC Micro Homerun PUR patchcord, a = 1,2,3,5, or 10 (cable length in meters)	
889P-F3UBPM-a	Device PUR patchcord, 3-pin, a = 1,2,3,5, or 10 (cable length in meters)	
871A-TS3-PM	Field Attachable connectors	
889P-M3DC-H	IDC Feld Attachable Connectors	
1492-MS9X20	Labels	
898H-58PT-Ba	IDC Style distribution box, 8 port, No LED, 10-30VDC, 2A per channel/10A total	
	a = 5 (5m cable) or 10 (10m cable)	
898H-P58PT-Ba	IDC Style distribution box, 8 port, LED, 10-30VDC, 2A per channel/10A total	
	a = 5 (5m cable) or 10 (10m cable)	
889A-HCC3	3-pole IDC insert	
889D-F4UB-a	DC Micro Device cordset,	
	a = 5 (5m cable) or 10 (10m cable)	
889D-F4AC-2	Recommended cordset: 2m, 4-pin DC Micro (straight)	
889D-R4AC-2	Recommended cordset: 2m, 4-pin DC Micro (Right angle)	
1485A-M12	Sealing Caps	
1492-MS9X20	Labels	
888H-T4DC3-0M3	4-Pin Straight Receptacle	
	Ethernet Media	
1785-TR10BT	Twisted Pair transceiver with an AUI interface to 10Mbit/s CSMA / CD LAN (ISO/IEC 8802-3, 10BaseT) shielded cable.	
1785-TR10BF	Fibor Optic transceiver with an AUI interface to 10Mbit/s CSMA / CD LAN (ISO/IEC 8802-3, 10BaseT) shielded cable.	
1785-TR10B2	Thin-wire, Twisted Pair transceiver with an AUI interface to 10Mbit/s CSMA / CD LAN (ISO/IEC 8802-3, 10BaseT) shielded cable.	
1785-TR10B5	Thick-wire, Twisted Pair transceiver with an AUI interface to 10Mbit/s CSMA / CD LAN (ISO/IEC 8802-3, 10BaseT) shielded cable.	
1788-MCHKR	Network MediaCenter, handheld diagnostic tool that analyzes EtherNet/IP physical media	
1788-EN2DN	EtherNet/IP to DeviceNet linking device	
1585D-M4TBDM-a	Ethernet 4-pin M12 cordset, TPE Flex, Male M12 D to Male M12 D,	
	a = length 0M3 (0.3m), 0M6 (0.6m), 1 (1m), 2 (2m), 5 (5m), 10 (10m)	
1585D-M4TB-a	Ethernet 4-pin M12 cordset, TPE Flex, Male M12 D to flying leads,	
	a = length 0M3 (0.3m), 0M6 (0.6m), 1 (1m), 2 (2m), 5 (5m), 10 (10m)	
1585J-M8CC-H	Ethernet 4-pin M12 cordset, RJ45 Insulation Displacement Connector (IDC)	
1585J-M8CC-C	Ethernet 4-pin M12 cordset, RJ45 Crimp Connector with Boot	
1585J-MaTBJM-b	Ethernet RJ45 cordset, Teal Robotic TPE, Flex rated	

	a = 4 (four Conductors) -or- 8 (eight conductors)	
	b = length 0M3 (0.3m), 0M6 (0.6m), 1 (1m), 2 (2m), 5 (5m), 10 (10m)	
1585J-M8VBJM-b	Ethernet RJ45 cordset, Red Robotic TPE, Flex rated, 8 (eight conductors)	
	b = length 0M3 (0.3m), 0M6 (0.6m), 1 (1m), 2 (2m), 5 (5m), 10 (10m)	
1585J-M8PBJM-b	Ethernet RJ45 cordset, Teal Riser PVC, standard rated, 8 (eight conductors)	
	b = length 0M3 (0.3m), 0M6 (0.6m), 1 (1m), 2 (2m), 5 (5m), 10 (10m)	
1585J-M8CC-H	Ethernet 4-pin M12 cordset, RJ45 Insulation Displacement Connector (IDC)	
1585J-M8CC-C	Ethernet 4-pin M12 cordset, RJ45 Crimp Connector with Boot	
	Motor Controllers	
150a-bcdefg	SMC Dialog Plus Smart Motor Controller – 460VAC: Open and Non-Combination	
	a = blank (Solid-State Controller)	
	B (Solid-State Controller and Isolation Contactor –enclosed only)	
	b = B24 (24A, 1-15Hp), B35 (35A, 1-15Hp), B54 (54A, 1-40Hp), B97 (97A, 5-75HP),	
	B135 (135A, 5-100Hp), B180 (180A, 5-150Hp), B240 (240A, 5-200Hp),	
	B360 (360A, 5-300Hp), B500 (500A, 4-400Hp), B650 (650A, 5-500Hp),	
	B720 (720A, 5-600Hp), B850 (850A, 10-700Hp), B1000 (1000A, 10-800Hp),	
	c = Enclosure Type:	
	N (Open), A (Type 1-IP30), F (Type 4 –IP65), J (Type 12 – IP54), H (Type 3)	
	d = Input Line Voltage (3 phase, 50 and 60 Hz):	
	Open Type:	
	B (200-460VAC), C (200-575VAC),	
	Non-Combination Enclosed	
	H (200-208VAC), A(230VAC), B (200-460VAC), C (200-575VAC),	
	e = Control Voltage:	
	D (100-240VAC), R (24VAC/DC)	
	f = Control Options	
	blank (standard), B (Pump Control), C (Preset Slow Speed),	
	D (SMB Smart Motor Braking), E (Accu-Stop), F (Slow Speed with Braking)	
	g = Options: 8L (Line-Mounted Protective Module)	
	8M (Load-Mounted Protective Module)	
	8B (Line- and Load-Mounted Protective Modules)	
15a-bcdefg	SMC Dialog Plus Smart Motor Controller – 460VAC: Combination	
	a = 2B (Solid-State Controller with Fusible Disconnect and Isolating Contactor),	
	2H (Solid-State Controller with Fusible Disconnect),	
	3B (Solid-State Controller with Cirucit Breaker and Isolating Contactor	
	3H (Solid-State Controller with Cirucit Breaker)	
	b = B24 (24A, 1-15Hp), B35 (35A, 1-15Hp), B54 (54A, 1-40Hp), B97 (97A, 5-75HP),	
	B135 (135A, 5-100Hp), B180 (180A, 5-150Hp), B240 (240A, 5-200Hp),	
	B360 (360A, 5-300Hp), B500 (500A, 4-400Hp), B650 (650A, 5-500Hp),	
	B720 (720A, 5-600Hp), B850 (850A, 10-700Hp), B1000 (1000A, 10-800Hp),	
	c = Enclosure Type:	

	A (Type 1-IP30), F (Type 4 –IP65), J (Type 12 – IP54), H (Type 3)	
	d = Input Line Voltage (3 phase, 50 and 60 Hz):	
	HD (200-208VAC), AD (230VAC), BD (200-460VAC), CD (200-575VAC),	
	e = Control Options	
	blank (standard), B (Pump Control), C (Preset Slow Speed),	
	D (SMB Smart Motor Braking), E (Accu-Stop), F (Slow Speed with Braking)	
	f = 39 (5Hp), 40 (7.5Hp), 41 (10Hp), 42 (15Hp), 43 (20Hp), 44 (25Hp), 46 (40Hp),	
	47 (50Hp), 48 (60Hp), 49 (75Hp), 50 (100Hp), 51 (125Hp), 52 (150Hp), 54 (200Hp),	
	56 (250Hp), 57 (300Hp), 58 (350Hp), 59 (400Hp), 60 (450Hp), 61 (500Hp),	
	72 (600Hp), 73 (700Hp), 65 (800Hp), 67 (1000Hp)	
	g = Options: 8L (Line-Mounted Protective Module)	
	8M (Load-Mounted Protective Module)	
	8B (Line- and Load-Mounted Protective Modules)	
150-FbbbcdRfg	Standard SMC Flex Control Module, ratings at 460VAC, 24V Control Voltage	
	bbb = 5 (5A, 3Hp), 25 (25A, 15Hp), 43 (43A, 30 Hp), 60 (60A, 40Hp), 85 (85A, 60Hp),	
	108 (108A, 75Hp), 135 (135A, 100Hp), 201 (201A, 150 Hp), 251 (251A, 200Hp,	
	317 (317A, 250Hp), 361 (361A, 300Hp), 480 (480A, 400Hp), 625 (625A,500Hp),	
	780 (780A, 600Hp), 970 (970A, 800Hp), 1250 (1250A, 1000Hp)	
	c = F (NEMA Type 4/12 (IP65) or N (Open)	
	d = Open Type:	
	B (200-460VAC, 3Ø), C (200-575VAC, 3Ø), Z (230-690VAC, 3Ø)	
	Non-Combination Type:	
	H (200-208VAC, 3Ø), A (230VAC, 3Ø), B (400-460VAC, 3Ø)	
	f = blank (standard), B (Pump Control), D (Braking Control)	
	g = Non Combination Type only:	
	8L (Line-mounted Protective Module)	
	8M (Load-mounted Protective Module)	
	8B (Line- and Load-Mounted Protective Module)	
15aH-Fbbbcdefg	Combination SMC Flex Control Module, ratings at 460VAC, 24V Control Voltage	
	a = 2 (Solid-State Controller with Fusible Disconnect)	
	3 (Solid-State Controller with Circuit Breaker)	
	bbb = 5 (5A, 3Hp), 25 (25A, 15Hp), 43 (43A, 30 Hp), 60 (60A, 40Hp), 85 (85A, 60Hp),	
	108 (108A, 75Hp), 135 (135A, 100Hp), 201 (201A, 150 Hp), 251 (251A, 200Hp,	
	317 (317A, 250Hp), 361 (361A, 300Hp), 480 (480A, 400Hp), 625 (625A,500Hp),	
	780 (780A, 600Hp)	
	c = F (NEMA Type 4/12 (IP65)	
	d = HD (200-208VAC, 3Ø), AD (230VAC, 3Ø),	
	BD (400-460VAC, 3Ø), CD (500-575VAC, 3Ø)	
	e = blank (standard), B (Pump Control), D (Braking Control)	
	f = 33 (0.5 Hp), 34 (0.75Hp), 35 (1Hp), 36, (1.5Hp), 37 (2Hp), 38 (3Hp), 39 (5Hp),	
	40 (7.5Hp), 41 (10Hp), 42 (15Hp), 43 (20Hp), 44 (25Hp), 45 (30Hp), 46 (40Hp)	

	47 (50Hp), 48 (60Hp), 49 (75Hp), 50 (100Hp), 51 (125Hp), 52 (150Hp),	
	54 (200Hp), 56 (250Hp), 57 (300Hp), 58 (350Hp), 59 (400Hp), 60 (450Hp),	
	61 (500Hp), 62 (600Hp), 63 (700Hp), 65 (800Hp), 67 (1000Hp)	
	g = 8L (Line-mounted Protective Module)	
	8M (Load-mounted Protective Module)	
	8B (Line- and Load-Mounted Protective Module)	
	Drives/ Inverters	
22B-Dxx1x4	PowerFlex 40 (480Vac), 1.4A – 24A (0.5HP-15HP)	
	PowerFlex 40 communication adapters	
22-COMM-a	a = D (DeviceNet), E (EtherNet/IP), P (Profibus)	
	PowerFlex 40 Human Interface Modules	
	a = A3 (Full Numeric LCD, IP20),	
	C2S (Panel Mount LCD, IP66),	
22-HIM-a	B1 (Bezel Kit, Panel Mount LCD, IP20)	
PowerFlex 70	20AD-xxxAYxxNxN	PowerFlex 70 (480Vac), 1.1A – 65A (0.5HP - 50HP)
PowerFlex 700	20BDxxxxxxxx	PowerFlex 700 (480Vac)
	21BDxxxxxxxx	PowerFlex 700 Packaged Drives
	20DDxxxxxxxx	PowerFlex 700S (480Vac)
	9306-4EXP02ENE	Drives Explorer (Software) WIN95,98,NT,2000,XP
	20COMME	PowerFlex 70, 700, 700S, 700L EthernetI/P Communication Module
	20COMMP	PowerFlex 70, 700, 700S, 700L Profibus Communication Module
		PowerFlex 70, 700, 700S, 700L Human Interface Module
		a = A2 (Digital Speed LCD, IP20),
		A3 (Full Numeric LCD, IP20),
		A5 (Programmer only LCD, IP20),
		B1 (Bezel Kit, Panel Mount LCD, IP20),
		C3S (Full Numeric, Panel Mount LCD, IP66),
	20-HIM-a	C5S (Programmer Only, Panel Mount LCD, IP66)
	1321-3Txxxx-BB	Isolation Transformer (460Vac)
	1321-3Rxxxx-B,C,D	Line Reactor (480Vac)
	CM201 Family Motors - Vector Duty Enclosed, Small AC Motor	
	b = Enclosure	
	c = Horsepower	
	d = Base Speed	
	e = Voltage (For Powertrain applications: 380, 460, 575)	
	f = Efficiency	
	g = CT or VT required	
	h = Mounting	
CM201 - bcdefghij	I = Final Descriptor	

	j = Version	
	CM202 Family Motors - Vector Duty Enclosed, Small AC Motor	
	b = Enclosure	
	c = Horsepower	
	d = Base Speed	
	e = Voltage (For Powertrain applications: 380, 460, 575)	
	f = Efficiency	
	g = CT or VT required	
	h = Mounting	
	I = Final Descriptor	
CM202 - bcdefghij	j = Version	
	CM203 Family Motors - Vector Duty Enclosed, Small AC Motor	
	b = Enclosure	
	c = Horsepower	
	d = Base Speed	
	e = Voltage (For Powertrain applications: 380, 460, 575)	
	f = Efficiency	
	g = CT or VT required	
	h = Mounting	
	I = Final Descriptor	
CM203 - bcdefghij	j = Version	